

URBAN AND COMMUNITY FORESTRY ACT OF 1989

HEARING

BEFORE THE

**SUBCOMMITTEE ON FORESTS, FAMILY FARMS,
AND ENERGY**

OF THE

**COMMITTEE ON AGRICULTURE
HOUSE OF REPRESENTATIVES**

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

ON

H.R. 2144

JUNE 7, 1989

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URBAN AND COMMUNITY FORESTRY ACT OF 1989

WEDNESDAY, JUNE 7, 1989

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON FORESTS, FAMILY FARMS, AND ENERGY,
COMMITTEE ON AGRICULTURE,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:35 a.m., in room 1302, Longworth House Office Building, Hon. Harold L. Volkmer (chairman of the subcommittee) presiding.

Present: Representatives Olin, Jontz, Johnson, Harris, Morrison, Marlenee, Smith, Schuette, and Herger.

Staff present: Daniel E. Brinza, counsel; Joseph Muldoon, assistant counsel; John E. Hogan, minority counsel; Glenda L. Temple, clerk; Timothy P. De Coster, James R. Lyons, and Allison Biggs.

OPENING STATEMENT OF HON. HAROLD L. VOLKMER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MISSOURI

Mr. VOLKMER. The subcommittee is meeting this morning to review H.R. 2144, the Urban and Community Forestry Act of 1989. This bill was introduced by a colleague, the gentleman from Indiana, Mr. Jontz. This bill is generally designed to promote the planting and successful maintenance of trees in urban and community settings through research, technical assistance, and competitive grants.

We have a number of witnesses today who will describe the need for such a program. I should note that while our subcommittee always strives to develop balanced hearings, staff was not able to identify any organized opposition to this measure. We will certainly hold the record open for 10 days so that we may receive any additional comments beyond today's testimony, whether supporting or opposing the legislation.

Following the hearing on H.R. 2144, the subcommittee will conduct a business meeting to consider H.R. 1011, Mr. Herger's bill to create a National Commission on Natural Resources Disasters.

[H.R. 2144 follows:]

101ST CONGRESS
1ST SESSION

H. R. 2144

To improve forest management in urban areas and other communities, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

APRIL 27, 1989

Mr. JONTZ introduced the following bill; which was referred to the Committee on Agriculture

A BILL

To improve forest management in urban areas and other communities, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the "Urban and Community
5 Forestry Act of 1989".

6 **SEC. 2. FINDINGS.**

7 The Congress finds that—

8 (1) the health of forests in urban areas, including
9 cities, their suburbs, and towns, in the United States is
10 on the decline;

1 (2) forest lands, shade trees, and open spaces in
2 urban areas improve the quality of life for residents;

3 (3) forest lands and associated natural resources
4 enhance the economic value of residential and commer-
5 cial property in urban settings;

6 (4) tree plantings in urban areas can aid in reduc-
7 ing carbon dioxide emissions, mitigating the heat island
8 effect, and reducing energy consumption, thus contrib-
9 uting to efforts to reduce global warming trends;

10 (5) efforts to encourage tree plantings and protect
11 existing open spaces in urban areas can contribute to
12 the social well-being and promote a sense of communi-
13 ty in these areas; and

14 (6) strengthened research, education, technical as-
15 sistance, and public information and participation in
16 tree planting and maintenance programs for the urban
17 forest resource is needed to provide for the protection
18 and expansion of tree cover and open space in urban
19 areas.

20 **SEC. 3. PURPOSES.**

21 The purposes of this Act are to—

22 (1) improve understanding of the benefits of pre-
23 serving existing tree cover in urban areas;

1 (2) encourage owners of private residences and
2 commercial properties to maintain trees and expand
3 forest cover on their properties;

4 (3) provide education programs and technical as-
5 sistance to State and local organizations (including
6 community associations and schools) in maintaining for-
7 ested lands and individual trees in urban settings and
8 identifying appropriate tree species and sites for ex-
9 panding forest cover;

10 (4) implement a tree planting program to comple-
11 ment urban tree maintenance and open space
12 programs;

13 (5) promote the establishment of demonstration
14 projects in selected urban settings to demonstrate the
15 benefits of maintaining and creating forest cover and
16 trees;

17 (6) enhance the technical skills and understanding
18 of sound tree maintenance and arborcultural practices
19 of individuals involved in the planning, development,
20 and maintenance of community forests and trees; and

21 (7) expand existing research and educational ef-
22 forts intended to improve understanding of tree growth
23 and maintenance, tree physiology and morphology, spe-
24 cies adaptations, forest ecology, and the economic, en-

1 vironmental, social, and psychological benefits of trees
2 and forest cover in urban environments.

3 **SEC. 4. URBAN AND COMMUNITY FORESTRY RESEARCH**
4 **PROGRAM.**

5 The Secretary of Agriculture shall, within 180 days
6 after the date of enactment of this Act, submit a report to the
7 Congress which includes—

8 (1) a review of all ongoing research associated
9 with urban forests, arborcultural practices, and the eco-
10 nomic, social, and psychological benefits of trees and
11 forest cover in urban environments being conducted by
12 the Forest Service, other Federal agencies, and associ-
13 ated land grant colleges and universities;

14 (2) recommendations for new and expanded re-
15 search efforts directed toward urban forestry concerns;
16 and

17 (3) a summary of research priorities and an esti-
18 mate of the funds needed to implement such research,
19 on an annual basis, for the next 10 years.

20 **SEC. 5. EDUCATION AND TECHNICAL ASSISTANCE ACTIVITIES.**

21 (a) **IN GENERAL.**—Section 6 of the Cooperative
22 Forestry Assistance Act of 1978 (16 U.S.C. 2105) is amend-
23 ed by adding at the end the following:

24 “(d) In carrying out this section the Secretary shall im-
25 plement an expanded program of education and technical as-

1 sistance for urban forest resources. The program shall be
2 designed to—

3 “(1) assist such areas in conducting inventories of
4 their urban forest resource, including inventories of the
5 species, number, location, and health of urban trees,
6 and the status of related resources (including fish and
7 wildlife habitat, water resources, and trails);

8 “(2) assist State and local organizations (including
9 community associations and schools) in organizing and
10 conducting urban and community forestry projects and
11 programs;

12 “(3) improve education and technical support in—

13 “(A) selecting tree species appropriate for
14 planting in urban environments;

15 “(B) providing for proper tree planting,
16 maintenance, and protection in urban areas;

17 “(C) protecting individual trees and preserv-
18 ing existing open spaces; and

19 “(D) identifying opportunities for expanding
20 tree cover in urban areas;

21 “(4) assist in the development of State and local
22 management plans for trees and associated resources in
23 urban areas; and

24 “(5) increase public understanding of the econom-
25 ic, social, environmental, and psychological values of

1 trees and open space urban area environments and
2 expand the knowledge of the ecological relationships
3 and benefits of trees and related resources in urban
4 environments.

5 “(e)(1) The Secretary shall establish an urban and com-
6 munity forestry competitive grants program to assist in pro-
7 viding support for urban and community forestry projects.
8 Funds or other forms of support shall be provided under such
9 program to assist local and community groups in implement-
10 ing urban forestry projects. Grants made under such program
11 shall be based upon the criteria developed by, and recommen-
12 dations received from, the National Urban and Community
13 Forestry Council.

14 “(2) The Federal share of support for a project provided
15 under this subsection may not exceed 50 percent of the sup-
16 port for that project and shall be provided on a matching
17 basis. The non-Federal share of such support may be in the
18 form of cash, services, or in-kind contributions, fairly valued.

19 “(f)(1) The Secretary, in cooperation with the State for-
20 esters or equivalent State officials, shall make sources of
21 plant materials available to urban areas from public or pri-
22 vate sources for the purpose of reforesting open spaces, re-
23 placing dead and dying urban trees, and expanding tree cover
24 in urban areas.

1 “(2) Through the expanded education and technical as-
2 sistance authorized by subsection (d), the Secretary shall
3 assist in the selection, planting, and maintenance of such
4 materials.

5 “(g)(1) The Secretary shall establish a National Urban
6 and Community Forestry Advisory Council for the purpose
7 of—

8 “(A) developing a national urban and community
9 forestry action plan;

10 “(B) evaluating the implementation of that plan;
11 and

12 “(C) developing criteria for, and submitting rec-
13 ommendations with respect to, the urban and commu-
14 nity forestry competitive grants program under subsec-
15 tion (e).

16 (2)(A) The Council shall be composed of 15 members
17 appointed by the Secretary, as follows:

18 “(i) 2 members from national nonprofit forestry
19 and conservation organizations.

20 “(ii) 1 member from State government and 1
21 member from local governments.

22 “(iii) 1 member from the forest products nursery
23 or related industries and 1 member from forestry, land-
24 scape, or urban design consultants.

1 “(iv) 2 members from academic institutions with
2 an expertise in urban forestry activities.

3 “(v) 2 members from State forestry organizations
4 or an equivalent State organization.

5 “(vi) 2 members from the Extension Service.

6 “(vii) 2 members from the Forest Service.

7 “(viii) 1 member who is not an officer or em-
8 ployee of the United States and who shall be the chair-
9 man of the Council.

10 A vacancy in the Council shall be filled in the manner in
11 which the original appointment was made.

12 “(B)(i) Except as provided in clauses (ii) and (iii) mem-
13 bers shall be appointed for terms of 3 years.

14 (ii) Of the members first appointed—

15 (I) 5, including the chairman, shall be appointed
16 for a term of 3 years;

17 (II) 5 shall be appointed for a term of 2 years;
18 and

19 (III) 5 shall be appointed for a term of 1 year,
20 as designated by Secretary at the time of appointment.

21 “(iii) Any member appointed to fill a vacancy occurring
22 before the expiration of the term for which his predecessor
23 was appointed shall be appointed only for the remainder of
24 such term. A member may serve after the expiration of his
25 term until his successor has taken office.

1 “(C)(i) Except as provided in clause (ii), members of the
2 Council shall serve without pay, but may be reimbursed for
3 reasonable costs incurred while in the actual performance of
4 duties vested in the Council.

5 “(ii) Members of the Council who are full-time officers
6 or employees of the United States shall receive no additional
7 pay, allowances, or benefits by reason of their service on the
8 Council.

9 “(3) Within 1 year after the date of enactment of this
10 subsection, the Council shall prepare a National Urban and
11 Community Forestry Action Plan. The plan shall include (but
12 not be limited to) the following:

13 “(A) An assessment of the current status of urban
14 forest resources in the United States.

15 “(B) A review of urban forestry programs and ac-
16 tivities in the United States, including education and
17 technical assistance activities conducted by the Forest
18 Service, Extension Service, and other Federal agen-
19 cies, the State forestry organizations, private industry,
20 private nonprofit organizations, community and civic
21 organizations and interested others.

22 “(C) Recommendations for improving the status of
23 the Nation’s urban and community forest resources, in-
24 cluding education and technical assistance, modifica-
25 tions required in existing programs and policies of rele-

1 vant Federal agencies, and recommended priorities for
2 implementing the research program developed by the
3 Secretary under section 4 of the Urban and Communi-
4 ty Forestry Act of 1989.

5 “(D) An estimate of the resources needed to im-
6 plement the plan for the succeeding 10 fiscal years.

7 “(E) The criteria to be used for evaluating pro-
8 posed projects under the urban and community forestry
9 competitive grants program under subsection (e), with
10 special emphasis given to projects that would demon-
11 strate the benefits of improved forest management (in-
12 cluding the maintenance and establishment of forest
13 cover and trees) in urban areas.

14 “(4) The Council shall submit the plan to the Secretary
15 and the Congress upon its completion. Beginning one year
16 after the plan is in effect, the Council shall annually submit a
17 review of the plan to the Secretary and the Congress. The
18 review shall consist of—

19 “(A) the Council’s assessment of prior year ac-
20 complishments in research, education, technical assist-
21 ance, and related activities in urban forestry;

22 “(B) the Council’s recommendations for research,
23 education, technical assistance, and related activities in
24 the succeeding year; and

1 “(C) the Council’s recommendations for urban and
2 community forestry competitive grant projects to be
3 funded in the succeeding year.

4 “(5) Upon request of the Council, the Secretary is au-
5 thorized to detail, on a reimbursable basis, any of the person-
6 nel of the Department of Agriculture to the Council to assist
7 the Council in carrying out its duties under this Act.

8 “(6) The Federal Advisory Committee Act (5 U.S.C.
9 App.) shall not apply to the Council.

10 “(h) For the purposes of this section—

11 “(1) the term ‘Council’ means the National Urban
12 and Community Forestry Advisory Council established
13 under subsection (g);

14 “(2) the term ‘plan’ means the National Urban
15 and Community Forestry Action Plan developed under
16 subsection (g)(3); and

17 “(3) the term ‘urban area’ includes cities, their
18 suburbs, and towns.

19 “(i) There is authorized to be appropriated \$20,000,000
20 for each of the fiscal years 1990 through 1999 to carry out
21 subsections (d), (e), (f), and (g).”.

22 (b) CONFORMING AMENDMENT.—Section 6(c) of the
23 Cooperative Forestry Assistance Act of 1978 (16 U.S.C.
24 2105(c)) is amended by striking “this section” and inserting
25 “subsection (b)”.



United States
Department of
Agriculture

Forest
Service

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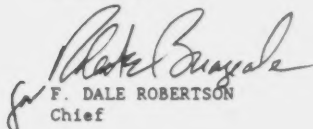
Date: OCT 2 1989

Honorable Sid Morrison
House of Representatives
Washington, D.C. 20515

Dear Congressman Morrison:

I understand that you would like clarification about the effect H.R. 2144, the "Urban and Community Forestry Act of 1989," would have on Forest Service State and Private Forestry programs. We believe H.R. 2144 would strengthen our authorization to carry out urban forestry programs. However, implementation of the legislation would be subject to the annual appropriations process. Under existing authority, our urban forestry program is funded at \$2.8 million for FY 1990. We do not see the passage of this act as adversely affecting in any way other State and Private Forestry programs.

Sincerely,


F. DALE ROBERTSON
Chief



Caring for the Land and Serving People

Mr. VOLKMER. At this time I would like to yield to the gentleman from Washington for an opening statement.

OPENING STATEMENT OF HON. SID MORRISON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF WASHINGTON

Mr. MORRISON. Thank you, Mr. Chairman. I have an opening statement I will submit for the record. I would comment only to our distinguished colleagues, Mr. Jontz and our good friend Claudine Schneider who is here, that the bill that they are supporting, Urban and Community Forestry Act, I think everyone is for. The testimony against it, Mr. Chairman, will come from the Budget Committee in that we have had this program on the books for a number of years, and while there is a relatively innovative approach using a Federal trust—we are eager to hear about that—that financing as with many other good ideas around this place is the enemy.

But I think the circumstances, Mr. Chairman, under which we want to grow trees everywhere we possibly can, have improved, have continued to pressure us, in fact, become almost a necessity. So I look forward to the hearing and also hope that we can get Mr. Herger's bill out of this subcommittee today and on its way again. I thank the chairman.

[The statement of Mr. Morrison follows:]

Sid Morrison

STATEMENT OF
THE HONORABLE SID MORRISON
SUBCOMMITTEE ON FORESTS, FAMILY FARMS AND ENERGY

JUNE 7, 1989

Mr. Chairman, I am pleased to join you today for consideration of two bills addressing our nation's forestry concerns. We will consider H.R. 2144, the Urban and Community Forestry Act, introduced by Mr. Jontz of Indiana. We will also revisit H.R. 1011, introduced by our colleague Mr. Herger of California, to establish a National Commission on Natural Resource Disasters.

Our first order of business is consideration of H.R. 2144, the Urban Community Forestry Act of 1989. Urban Forestry offers a proactive approach to some everyday problems. Community trees filter and remove air pollutants, prevent water pollution, reduce soil erosion, and aid against flooding in addition to their aesthetic contribution. The Forest Service has maintained an Urban Forestry program since 1978 with the goal of enhancing community life and aiding the biological environment of our cities. This program attempts to maximize awareness of urban forests to improve some of the problems I have mentioned already, and to reduce the effects of global warming and the amounts of carbon dioxide in our atmosphere. But funding for this program has been minimal. Mr. Jontz has offered a new approach, through this federal trust, and I am very interested in learning more about it and hearing today's witnesses.

We have already had one opportunity to take a look at H.R. 1011. Many of us are supporters of that legislation and, in fact, have joined in cosponsoring the legislation. Since our hearing, Mr. Herger has continued to work closely with the Forest Service to perfect and refine his legislation and I commend him for his efforts. I am looking forward to discussing those refinements and reporting this legislation from our Subcommittee today.

Thank you, Mr. Chairman.

Mr. VOLKMER. The Chair recognizes the gentleman from Indiana, the sponsor of the legislation, Mr. Jontz.

**OPENING STATEMENT OF HON. JIM JONTZ, A REPRESENTATIVE
IN CONGRESS FROM THE STATE OF INDIANA**

Mr. JONTZ. Thank you very much, Mr. Chairman. I certainly appreciate your scheduling of the hearing on this bill, and you have a very distinguished group of witnesses here today and look forward to hearing from them. H.R. 2144, the Urban and Community Forestry Act of 1989 will significantly strengthen the role of the Federal Government in the greening of our Nation's cities and towns. With increased concern by the public and the Congress about global warming and greater understanding about how trees and community settings contribute positively to our way of life, I believe that the time is right for urban forestry legislation.

I appreciate the comments of my colleague, the ranking Republican member, Sid Morrison, about the existing efforts that are being made, but this legislation would contemplate some additional efforts, but I hope could be accomplished at modest cost. And I want to take just a couple of minutes to review the major provisions of H.R. 2144.

First of all, the legislation directs the Secretary of Agriculture to submit a report to the Congress that would review ongoing research associated with urban forestry and recommend new and expanded efforts directed toward urban forestry concerns, summarizing priorities and estimating funds that are necessary.

Since 1978 the Forest Service has been working in cooperation with State forestry agencies and universities on urban forestry research. This effort is complemented by the educational efforts of the Cooperative Extension Service. The language in H.R. 2144 would enable us to look at the priorities and identify new direction for urban forestry research.

H.R. 2144 would also amend existing law to provide for technical assistance to State and local organizations including community associations, municipal governments, schools, any number of entities at the local level that are interested in urban and community forestry.

This assistance would include inventories of urban forest resources, assistance to organizations and educational and technical support so far as tree species, selection, planting, maintenance, protection; assistance in the development of State and local management plans for trees; the development of programs to increase public understanding of the benefits of urban forestry.

Considerable research and technical assistance is needed to take better care of our Nation's urban forests. The American Forestry Association tells us that an oak or a maple tree that would live 200 years in a natural setting has an average life span of 32 years in a city with stressful conditions.

We do not have all the answers about how to successfully manage trees in an urban environment, but through continuing research and then use of the cooperative forestry system to make this information available at the community level, it will be possible to

extend the life span of our Nation's urban trees through better planting and management practices.

The third major provision of H.R. 2144 directs the Secretary to establish an Urban and Community Forestry Competitive Grants Program on a 50 percent matching basis. So the non-Federal share could be in the form of cash, services, or in-kind contributions. I envision this grant program as being helpful in stimulating innovative urban forestry programs and also leveraging private resources to apply to the existing needs.

Studies have found that our communities are not able at the present time to devote sufficient resources to their urban forestry needs. The sad fact is that for every four trees in a city environment that die or are removed, only one is planted. I think that the Competitive Grants Program would provide some stimulus to local communities and with the availability of technical assistance help them use their dollars more effectively to meet the needs and improve that ratio.

Finally, H.R. 2144 directs the Secretary to establish a National Urban and Community Forestry Council to develop plans at the national level to address urban forestry needs in this country, will provide us some needed coordination and partnership approach to ensure that the Federal Government, States and local communities are working together to tackle this problem.

Finally, I want to note that the bill as it is now written calls for an authorization of \$20 million for each of the fiscal years 1990 through 1999. And in recognition of the authorization language in the existing code, I certainly would concur in the deletion of this specific authorization language in H.R. 2144.

Our Nation's urban and community forest cover approximately 70 million acres and are worth about \$50 billion. H.R. 2144 recognizes the value of this resource to our country and seeks to protect it and expand it, and I think that the committee will find that the involvement of the Federal Forest Service and the cooperative forest system that we have through the provision of this legislation can be very helpful to local communities and help us make progress in meeting the challenges in urban forestry.

I particularly want to welcome our colleague Claudine Schneider today. As everyone in the Congress knows, she has been the leader in efforts to address the problems of global warming, and I appreciate her cosponsorship of this legislation and her appearance today, and I want to thank my colleagues for their interest in the legislation, and thank all the witnesses in advance for their helpful testimony today. Thank you very much, Mr. Chairman.

[The statement of Mr. Jontz follows:]

TESTIMONY OF REP. JIM JONTZ
IN SUPPORT OF
H.R. 2144, THE URBAN AND COMMUNITY FORESTRY ACT OF 1989
Subcommittee on Forests, Family Farms and Energy
House Agriculture Committee
June 7, 1989

Mr. Chairman, I appreciate you holding a hearing on this bill which I have introduced, H.R. 2144. We have a very distinguished group of witnesses here today, and I look forward to hearing from them.

H.R. 2144, the Urban and Community Forestry Act of 1989, will significantly strengthen the role of the federal government in the greening of our nation's cities and towns. With increased concern by the public and the Congress about global warming, and greater understanding about how trees in community settings contribute positively to our quality of life, I believe that the time is right for urban forestry legislation.

The federal government can do a better job of promoting urban forestry and helping local governments and citizens add more and healthier trees to America's community streets. Our witnesses today will discuss the benefits of urban forestry. I would like to take a moment to discuss the four major provisions of H.R. 2144:

H.R. 2144 directs the Secretary of Agriculture to submit a report to the Congress which will:

review all ongoing research associated with urban forests, arborculture practices, and the economic, social, and psychological benefits of trees and forest cover in urban environments;

recommend new and expanded research efforts directed toward urban forestry concerns; and

summarize research priorities and estimate the funds needed to implement such research.

Since 1978 the Forest Service has been working in cooperation with state forestry agencies and universities on urban forestry research. The Cooperative Extension Service also supports educational programs. This report would enable us to see where we have been, and where we need to go.

H.R. 2144 would also amend existing law to provide for education and technical assistance activities to state and local organizations including community associations and schools. This will include:

inventories of urban forest resources;
assistance to state and local organizations in
education and technical support in tree species

selection, planting, maintenance, and protection,
and identifying opportunities for expanding tree cover;

assistance in the development of state and local
management plans for trees and associated resources
in urban areas; and

development of programs to increase public
understanding of the economic, social, environmental,
and psychological values of trees and open space
urban area environments.

Considerable research and technical assistance is needed to take better care of our nation's urban forests. For instance, the American Forestry Association has found that an oak or maple tree which would live to 200 years in a natural setting has an average life span of 32 years in a stressful urban setting. The reasons for this are varied, ranging from polluted air to neglect to a lack of adequate room. We do not have all of the answers to managing a successful urban forest which would enable us to extend the life of a tree to that in a natural environment. However, by continuing research, and then using the cooperative forestry system to make this information available to municipalities and community groups, it will be possible to extend the lifespan of our nation's urban trees through better management practices.

The third major provision of H.R. 2144 directs the Secretary of Agriculture to establish an urban and community forestry competitive grants program on a 50% matching basis. The non-federal share may be in the form of cash, services, or in-kind contributions. This grant program can be used to stimulate innovative urban forestry programs, in addition to providing basic assistance. Such a program will also leverage private resources.

Studies have found that our communities have been unable to devote sufficient resources to their urban forests. Between \$400 and \$500 million is provided for in local tree care budgets, an amount which is inadequate compared to the need. Evidence of this is a 1986 survey which found that for every four urban trees that die or are removed, only one is planted.

Finally, H.R. 2144 directs the Secretary to establish a National Urban and Community Forestry Council, composed of 15 members appointed by the Secretary. This Council will develop a National Urban and Community Forestry Action plan, evaluate the implementation of that plan, and develop criteria for the urban and community forestry competitive grants program.

The partnership envisioned under this provision would help ensure that the federal government, states, and local communities are working together to make the most effective use of urban forestry money.

Finally, I should note that the bill as it is now written calls for an authorization of \$20,000,000 for each of the fiscal years 1990 through 1999. In recognition of authorization language in the existing code, I will concur in the deletion of this provision H.R. 2144.

Our nation's urban and community forests cover approximately 70 million acres, and are worth about \$50 billion. H.R. 2144 recognizes the value of this resource to our country, and seeks to protect and expand it. I look forward to working with my colleagues in sending this legislation to the full committee.

(Attachment follows:)

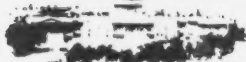
JIM JONTZ
5th District, Indiana

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May 8, 1989

Dear Colleague: ~

Please consider cosponsoring H.R. 2144, the Urban and Community Forestry Act of 1989.

Urban and community forestry? It's simply the planting, care and maintenance of trees in our cities and towns using sound arboriculture practices.

There's no question about the benefits of trees in the communities where people live. Trees help to "cool off and green up" our neighborhoods by breaking up heat, cutting noise, and adding natural beauty. They also consume CO₂ and other "greenhouse gases," thus reducing the trend of global warming.

What may not be appreciated is the extent to which we're losing the battle" for the greening of our cities and towns. Trees in the city are in a stressful environment, and in spite of the good efforts of many local governments and community groups, there's only one tree planted for every four removed from our cities at the present time.

The U.S. Forest Service and our state forestry departments have expertise in planting, care, and maintenance of trees which can be very helpful to local government and citizens.

What H.R. 2144 seeks to do - without taking away from traditional Forest Service programs - is to strengthen and expand the role of the federal government in urban forestry programs by:

- 1.) focusing urban forestry research on the most critical needs for information on species selection and maintenance in urban settings;
- 2.) establishing technical assistance, information, and education programs for local governments and community groups through the U.S. Forest Service and cooperating state forestry departments;
- 3.) establishing a 50% matching grant program for federal assistance to communities for innovative urban forestry programs; and
- 4.) creating a National Urban and Community Forest Council to coordinate efforts between federal, local, and private urban forestry interests, and to provide a national Urban and Community Forestry Plan.

This legislative was drafted with the assistance, and has the endorsement of the American Forestry Association, the National Association of State Foresters, and the American Nurserymen's Association.

If you would like to cosponsor this bill, or have any questions, please call Richard Jones of my staff at 5-5037.

With best wishes.

Sincerely,

JIM JONTZ
Member of Congress

Mr. VOLKMER. Thank you, Mr. Jontz. I too wish to extend a warm welcome to our first witness here today to start off the panel. As a Congresswoman, she has been in the forefront on many environmental problems and offering valid solutions. Therefore, I look forward to her testimony. So we will now hear from Honorable Claudine Schneider, a Member of Congress from Rhode Island. Claudine.

STATEMENT OF HON. CLAUDINE SCHNEIDER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF RHODE ISLAND

Miss SCHNEIDER. Thank you kindly, Mr. Chairman, and I do appreciate the opportunity to appear before all of you, particularly before Sid "Appleseed" Morrison who has taken on from the private sector the initiative to plant many trees on his own. But I will say that beyond the involvement of the private sector there clearly is a need for this legislation, and you gentlemen may or may not be aware that there is a whole new wave that is moving through the country right now when we talk about concern for the environment. And that concern is based on a cost benefit analysis which did not exist in the 1970's.

Now, yes, there is a reason that you had a hard time finding people opposed to Mr. Jontz' legislation, and that reason is that it is full of good ideas, but as Mr. Morrison points out, good ideas are just not going to cut it unless they can pass the cost benefit analysis and can really justify their existence.

Well, let me say that the provisions that are included in this legislation completely parallel those provisions for the Urban Forestry Conservation Program which are included in my global warming bill. There are many different global warming bills around the House and the Senate right now, but mine is the only one that does a cost benefit analysis.

And I would like to share with you a few of the reasons why tree planting makes the grade. Over a 50-year lifetime a tree will produce over \$30,000 worth of oxygen. It will provide \$62,000 worth of air pollution control. It will recycle \$37,000 worth of water, and it will control \$31,000 worth of soil erosion. We also find that on the average a forest tree absorbs about 13 pounds of carbon dioxide a year.

Now this may not have the sex appeal of perhaps a capital intensive project that supposedly will slow down or stop global warming, but very clearly it points out that prevention pays. We can find out that right now as most Americans are aware, carbon dioxide comprises over half of all greenhouse gas emissions, and the United States is responsible for about 9 million tons of CO₂ every day.

The planting of a tree can play a key role, and the American Forestry Association and the Lawrence Berkeley National Laboratory that you will be hearing from later on will point out that one of the lowest cost options available for reducing CO₂ happens to be planting of trees.

Now urban tree planting is something that we do not particularly always think about, but it offers outstanding benefits because of its additional value in shading and cooling buildings. Its energy conserving ability enables an urban tree to reduce up to 15 times

more carbon dioxide than a nonurban tree. This is achieved in large part by reducing the air conditioning needs of a building by as much as 50 percent, and I am sure that as you hear later from some of these experts this morning that they will point out the savings nationwide are tremendous.

The potential has been identified for planting upwards of 160 million trees in communities across the country. And the fact that it would reduce CO₂ emissions by tens of millions of tons of carbon dioxide per year and save consumers over billions of dollars a year on their energy bills certainly should put this in the winner's column.

It is an obvious win-win opportunity for the country to take responsible, preventive action on slowing the greenhouse warming and at the same time enhance our economic productivity by reducing the energy needed to produce a dollar's worth of GNP. The sad news is that right now only 1 tree is being replanted for every 4 trees that either die or are cut down, and in the wake of urban deforestation, the temperatures have been steadily rising.

Urban environments are typically 3 to 10 degrees hotter than surrounding countryside, and we know that very clearly here in Washington, DC. Now regrettably much of our focus here in the United States has been focused on the deforestation within countries such as Brazil and the Amazon, or in Africa, but here in our own backyard in order to have any credibility internationally, it is imperative that we provide the leadership. When the international community recognizes that we are only replanting 1 tree for every 4 that are destroyed, then we become vulnerable to the criticism that we are not practicing what we preach.

So I believe that as responsible leaders in the United States this kind of initiative is critically important. I might also point out that we can reverse the trend of global warming right now by acting on legislation that we are discussing this morning. The measures in this bill are vital for ensuring that proper and adequate research is carried out on selecting suitable species and that the correct procedures are identified for locating, planting and maintaining trees.

Now I serve on the Science and Technology Committee, and I can share with you that the value of research which is incorporated in this bill is also one of prevention and cost benefit value. The reason is that as we look into the more appropriate trees for planting, those that are more able to absorb the CO₂ and that are longer lasting and will grow in urban environments, we are investing dollars in the planting of trees which will in the long run have a positive, economic and environmental effect.

In addition to that, undertaking monitoring and evaluation of what works best will assure us that we will not be wasting our money. The matching grants are an essential aspect of this legislation in order to demonstrate what works, and to spur communities to undertake innovative reforestry programs. So I strongly support this legislation. I encourage the subcommittee to act on it as expeditiously as possible. And I also urge those members of this subcommittee to make sure that you are where the action is, and right now the action is on the global warming bill.

We have 131 cosponsors, and I have not checked, but I hope that every member that is here present today is a cosponsor of that bill,

and will help to move a segment of this by pushing for the Urban Reforestry Program. Thank you, Mr. Chairman.

[The prepared statement of Miss Schneider appears at the conclusion of the hearing.]

Mr. VOLKMER. I thank the gentlelady from Rhode Island for her statement. Are there any questions of the gentlelady from Rhode Island? Thank you very much. I appreciate your testimony here today.

Miss SCHNEIDER. Thank you very kindly.

Mr. VOLKMER. Our next witness will be Mr. Allan J. West, Deputy Chief, State and Private Forestry, Forest Service, USDA. Mr. West, as all the witnesses' testimony, will be made a part of the record. You may either review it in full or you may summarize, however you so desire.

STATEMENT OF ALLAN J. WEST, DEPUTY CHIEF, STATE AND PRIVATE FORESTRY, FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE

Mr. WEST. Fine, thank you, Mr. Chairman, and members of the subcommittee. Thank you for the opportunity to offer the Department of Agriculture's view on H.R. 2144, the Urban and Community Forestry Act of 1989.

The Department of Agriculture would not object to the enactment of H.R. 2144 if it is amended as we suggest. The Nation's urban forests, as you have heard today, are contained within 70 million acres that municipalities occupy. Trees in the urban areas add beauty and diversity to the landscape, improve water and air quality, moderate temperature extremes, reduce noise, control soil erosion, provide wildlife habitat and improve the overall quality of life in urban areas.

Research related to the role of trees in global climate change continue to document the importance of urban trees in energy conservation and in moderating temperatures. Not only do greenbelts, forested parks and expressway plantings provide these benefits, but also the trees that grace the city streets and people's backyards. The scattered and fragmented nature of the urban forest enhances its contribution to the well-being of people. So in addition to the physical benefits that trees provide, there are important psychological payoffs from urban forests. Trees provide environments that help reduce tension, promote recovery from illness and improve one's sense of well-being.

Urban and suburban areas are expanding, as you heard, by nearly 1 million acres annually. And as you heard from Congresswoman Schneider, currently in the average city 4 trees die or are removed for every tree planted. Urban trees and associated vegetation are often abused and overused, and more attention should be given to the protection and management of this important resource.

The Forest Service is authorized by the Cooperative Forestry Assistance Act of 1978 to provide technical and financial assistance to the States for urban forestry programs. The Extension Service is authorized by the Renewable Resource Extension Act of 1978 to provide educational programs in support of urban forestry.

H.R. 2144 would expand urban forestry authorities, establish a National Urban and Community Forestry Council, permit possible future expansion of education extension assistance and development of a Competitive Grants Program and provide a strong basis for cooperation and partnerships among Federal, State, and local governments, private organizations and individuals involved in urban and community forestry.

Forest Service urban forestry efforts began in mid-1960, and we provide financial and technical assistance to communities working through the State foresters. For example, in 1988, the Forest Service provided approximately \$1.3 million to States for urban and community forestry activities. State foresters used these funds to provide technical assistance involving more than 6,000 projects. In 1989, \$2.5 million was appropriated for the Forest Service urban forestry program. Educational assistance to people and communities on urban forestry is provided through State Extension organizations within the \$2.7 million appropriated for Renewable Resources Extension Act.

Through existing authorities, the Department has been successful in encouraging citizens groups, associations and public officials to be partners in developing new ways to promote the concepts of community tree planting and care. For example, in 1974, the Forest Service, the National Association of State Foresters, and the National Arbor Day Foundation established Tree City USA, a community program designed to recognize cities for the long-term commitment to tree planting and care. In the first year, 1976, the program produced 47 awardees, and in 1988 more than 900 communities qualified for Tree City USA designation.

The Forest Service research program includes \$860,000 for urban and community forestry research in 1989. This research is headquartered out of communities like Berkeley, California, Chicago, Illinois, and Syracuse, New York. Emphasis has been on development of improved procedures in selecting and growing trees in stressful urban forestry environments, analysis of the characteristics and functions of urban vegetation and the management of urban forests and parks for recreational uses.

These efforts have resulted in several accomplishments such as development of energy savings techniques for homes through the proper tree selection and placement; identification of the benefit of urban vegetation for reducing water runoff; and the development of guidelines for reforestation of urban forests and parks where the forest cover has been depleted; and also the identification of preferences and recreational activities of recreation areas used by black Americans and other important groups of urban dwellers.

H.R. 2144 would require the Secretary to submit a report to Congress which would renew ongoing research associated with urban forests and make recommendations for new and expanded research. The Forest and Rangelands Renewable Resource Research Act and the Forest and Rangelands Renewable Resource Planning Act provide adequate authority for this purpose. In our judgment, these two authorities combined with the annual budget process and annual report are sufficient to meet the intent of section 4.

Similarly, the Cooperative Forestry Assistance Act of 1978 and the Renewable Resource Extension Act of 1978 already require and

authorize the Secretary to provide technical, financial and educational assistance for urban forestry programs. We would not object, however, to amending these authorities to include a competitive grant component such as that provided in H.R. 2144.

In order for the proposed National Urban and Community Advisory Council to function smoothly and with strong support from the general public, we recommend that changes be made in the member composition of the council, the length of time initial members serve on the council, and the Secretary's role in administering the council.

Subsection 5(a) would authorize \$20 million to be appropriated. We recommend that this subsection be deleted since the Cooperative Forestry Assistance Act already authorizes the appropriation of such funds. The Forest Service and Extension Service would like the opportunity to work with the subcommittee on amendments we believe would address these concerns and clarify the bill.

We recognize the importance of urban and community forestry. Forestry coordination and research is appropriate to help provide guidance, educational material, experience and encouragement and technical expertise at the local level. Our Nation's urban forests deserve attention in order to protect and manage them for present and future generations. However, Federal financial assistance for urban forestry programs must be considered with other budget priorities and the need to reduce the overall Federal deficit. It is appropriate that States, cities, towns, organizations and individuals share a substantial portion of the cost as proposed in H.R. 2144.

So, overall, we do not oppose the bill if we can work with the committee on those few amendments. Thank you, Mr. Chairman.

[The prepared statement of Mr. West appears at the conclusion of the hearing.]

Mr. VOLKMER. Thank you very much, Mr. West, for your testimony and bringing to our attention how the present law already covers some of the areas, but this bill, the general provisions of the bill basically fit in with those also. So that I am sure that we can work together to harmonize all the minor problems that are with it.

And the gentleman from Indiana has already mentioned earlier that he is willing to strike the 20 million authorization provision in his opening statement so I am sure that we can work this into our present programs with some enlargement, I guess you would call it, of those. My question is to you in looking at the past administration as to funding for such things as State and private forestry and proposals through the OMB on those, it would not look real bright even if we enacted this, though, would it, for funding?

Mr. WEST. The current budget, of course, does not propose any funding for the cooperative forestry portion of the State and private program.

Mr. VOLKMER. Right. I think we may do a little different here in the Congress as far as that is concerned, but that was the administration budget; correct?

Mr. WEST. That is correct.

Mr. VOLKMER. I have no further questions. The gentleman from Washington.

Mr. MORRISON. Mr. West, I am pleased that USDA has taken a proactive view in this whole area, and I appreciate your testimony. Have you ever done any experimentation there on a couple of things? One, programs to help educate city dwellers as to the importance of trees? I think the 32-year lifespan that Mr. Jontz indicated in his opening statement on average indicates those trees probably are abused or run over or are not valued as they might be elsewhere. Is there any sort of, within the home economics program, or somewhere in our common school, public school system, a tree appreciation opportunity?

Mr. WEST. I believe the many programs of the private organizations and the work of the State foresters do produce documents or publications talking about the value of trees in urban areas. The problem with abuse of trees in the urban areas such as placement, road construction, and those kind of things; State foresters have worked with community foresters very specifically on the technical aspects of these problems. Such data is coming from the research program. So there is an ongoing technology transfer program from research to that which we have already done.

Mr. MORRISON. Certainly those are all steps in the right direction. I am also wondering if you have ever experimented with making trees available for citizens to plant? I know a number of organizations have done so. We periodically here get a supply of trees coming to our offices, but has this been done in an urban setting where people, you know, not only would plant those on their property, but perhaps even fronting on city streets and taking the responsibility for helping them through those early years?

Mr. WEST. I think there has been a limited amount of that through, again, the State foresters. Of course, we provide the technical and financial assistance to the State foresters and encourage that kind of program. There is a difference in the kind of tree, though, you plant in an urban area from what you do in the general forest. And some State nurseries do produce trees that can be planted in an urban setting, but of course, it is not in the same magnitude as those planted out in the general forest. I think this bill permits that to become more extensive.

Mr. MORRISON. Thank you very much, Mr. West. Thank you, Mr. Chairman.

Mr. VOLKMER. The gentleman from Indiana.

Mr. JONTZ. Thank you, Mr. Chairman. Mr. West, I certainly want to thank you for your very helpful statement and commend the Forest Service on your existing activities and your leadership, and I appreciate very much your positive suggestions about the improvement of this legislation. The one question I might ask is this.

Can you provide for the committee at this time a brief statement summarizing how the existing \$2.5 million appropriation is used and what areas in your opinion would be the priorities for expanding efforts were the Congress to make additional funds available?

Mr. WEST. Well, first of all, current funding is going for such things as a data base that everybody can get information from that is helpful to State forestry organizations and community urban forestry personnel to give them the latest information on what is available. Other activities are the continuation of the National Arbor Day Foundation and Tree City U.S.A., the working with or-

ganizations such as the American Forestry Association, and the National Urban Council which is a melding of all people that have an interest in this to move the program forward.

Future funds could be used in additional areas of research that we sorely need on planting stock, on additional information on the abuse of trees and how that may be prevented. Individual projects, through the Competitive Grants Program would result in stronger partnerships where we could take a section of a city that is almost devoid of vegetation, and in a competitive grants way bid for those with some financial assistance through the State forester's office to enhance that.

So I see an expansion of the program plus some things we need to do in inventories assessment that would be useful for the professionals in the field.

Mr. JONTZ. Thank you very much.

Mr. VOLKMER. The gentleman from California.

Mr. HERGER. No questions.

Mr. VOLKMER. The gentleman from Alabama.

Mr. HARRIS. No questions.

Mr. VOLKMER. The gentleman from Michigan.

Mr. SCHUETTE. Thank you very much, Mr. Chairman. Mr. West, I appreciate your time and the focus that the Department of Agriculture is placing on the urban forest issue. I have no specific comments at this point in time. I am looking forward to Dr. Kielbaso, if I am pronouncing that correctly—with my name of Schuette, I am quite sensitive to last names—quite a distinguished panelist from Michigan State University, and so I am most interested in the testimony as much as I can stay. I will yield back my time. Thank you.

Mr. VOLKMER. The gentleman from Oregon.

Mr. SMITH. No questions.

Mr. VOLKMER. All right. Thank you very much, Mr. West, for your testimony, and I look forward to working with you and the gentleman from Indiana and your staff to arrive at the compromises on the language within the bill so that we can move it forward at a later date. I appreciate your being here today and thank you for your statement.

Mr. WEST. Thank you, Mr. Chairman.

Mr. VOLKMER. Our next panel will be Dr. James Kielbaso, professor of forestry, Michigan State University, East Lansing, Michigan, and we will find out in a minute whether I have pronounced it right or Mr. Schuette pronounced it right. Dr. Hashem Akbari, leader, Heat Island Project, Lawrence Berkeley Laboratory, from Berkeley, California. And Dr. Alan Ek, department head and professor, College of Natural Resources, University of Minnesota in St. Paul.

Gentlemen, all of our statements as I have mentioned before will be made a part of the record. You may either summarize that statement or you may review it in full, however you so desire. Dr. Kielbaso, please proceed.

STATEMENT OF J. JAMES KIELBASO, PROFESSOR, URBAN FORESTRY, DEPARTMENT OF FORESTRY, MICHIGAN STATE UNIVERSITY

Mr. KIELBASO. Mr. Chairman, committee members, fellow Michiganiite, Mr. Schuette, I appreciate the opportunity to appear here today to testify in favor of H.R. 2144. I commend the sponsors for their vision of a more livable, kinder, gentler city. As a professor of forestry at Michigan State University specializing in urban forestry for approximately the last 20 years and involved with urban forestry research, teaching and extension, I feel that I am in a fairly unique position here.

I have been active in many different groups such as the International Society of Arboriculture, Society of American Foresters, Michigan Forestry and Park Association, the American Forestry Association, et cetera. I am here today speaking for myself. I do not have any particular permission to speak for these others although I do not think my views are differing from any of theirs.

I have been involved in a lot of different projects dealing with resident or citizen perceptions of trees and forests and their preferences, tree values, biology and ecology of trees, and management practices of urban trees.

First, I would like to give a very quick review of various research that is being done, and some research needs. We have done some surveys of managers of city forests and have identified some of their needs. Some of the research that we have done there has actually given some recommendations on practices that they should be involved with. Opportunities are numerous for research in tree selection, tree planting, care; things of this nature, just to keep trees surviving.

Urban soils present a tremendous challenge, and I will talk about that in a little while. The psychological and health values of trees offer great challenge. We do not understand everything that we would like to know about these. The potential contribution of trees to the environment that we will hear about from other panelists here are also very important. Unfortunately, we do not have much funding for this.

The research funding is just not there in sufficient quantities in my opinion. I have done three national surveys that I will pull a little bit of information from. In 1986 we did the most recent one. You have an appendix table here that is a summary of volunteered information that various city managers said is information that they would like to have available to them. Basically, 77 percent of this comes out to say we have problem with the survival of trees in cities, and we would like to have research that would help improve the survivability.

Regarding survivability, we have already heard people talking about how long trees live in cities. I have heard from 6 to 8 years. I have heard 30 years, 50 years, but I have never heard anyone say that trees in cities live longer than trees in forests. That is one thing we never hear anyone talking about. Survivability is important.

The first survey that we did in 1975 concurs basically with the results of the 1986 survey which says that the needs of research

are mostly around survivability. Disease, insects, species selection and care, how to get them to survive in cities. Urban trees represent one of the most important and most valuable resources in cities. We will hear later approximately how many times more valuable they are, but only 0.5 percent of city budgets are spent taking care of trees.

Very little money is spent taking care of these trees out of a total city budget. An interesting fact is that in cities that have good street tree programs, tax bases are actually raised. Realty experts have shown and estimated that where there are good tree programs along city streets, the residential tax basis goes up, and in fact, more is collected in these cities.

Precious little funding is devoted to researching tree selections, planting, growth, survival of trees that grow in close proximity to approximately 80 percent of the United States population. Needs we have: what tree species to plant, how to protect them from pests, how to help them survive, how to successfully grow trees in urban soil. I trust that most of you have worked in a backyard or worked someplace and touched the soil around you after development or after cities have been established.

I use the word "soil" very reservedly. It is more like concrete. I'd have football players helping me in a place that I was doing research, and they could not even get a hole into the ground. These are the sorts of places that we have to try to grow trees in cities. We need research on how to make trees, how to convince trees to grow there, how to make the situation possible for them. We need to know how much, what kind of soil, what minimum soil trees can survive in. We need to know what kind of space we need to provide, and we need to find ways to provide that space.

Some other exciting research that other people have been doing deal with health. We found that where patients in hospitals have an opportunity to look out a window and see trees, just like you probably do out of some your offices, have a much better feeling. People in hospitals have recovered more quickly, taken less pain killing drugs, consequently a savings for everyone.

We need to understand a little bit more about the psychological needs that people have and how trees affect them. Research has been done in Baltimore and Philadelphia and has shown that by planting trees, planting other plants and vegetation within these inner cities, people actually have a higher morale. They get together. They actually begin to clean up their own neighborhoods even more than they would have otherwise, principally and presumably as a result of having these trees planted there.

We need to understand some of the other values. Why do people go to wooded areas? Why do people want trees? What is it that causes people to go to these sorts of places? Why do Chicago residents, for instance, use the Cook County Forest Preserve in such a heavy way? Why do people there go to the Morton Arboretum in great numbers? Some information that is not in this testimony comes from some research that we did in research in which we asked residents in inner city Detroit some of their preferences, if they could change their tax expenditures, where would they like to see their monies switched?

Interestingly, or not surprisingly, education was No. 1. Second were park and street trees. Third were recreation programs. And down the line came law enforcement, waste water treatment and road reconstruction. I am not sure those are realistic, but this is what, if they had their opportunity, this is what they would like to change to.

Those same people when asked what they would like to see more of in their parks, they said more shady walks with benches, more trees and shrubs, more possible gardens and flower beds. Down the line came more active things like swimming pools, tennis courts and softball diamonds. When asked what they thought the city should provide, whether they should provide trees, they thought that the city should provide trees along tree-lined streets, and then followed by open parks and wooded areas.

There were significant differences in where they said the trees should be, and along streets was the highest. When asked what they felt the relative importance of the city providing trees were, they felt again that along city streets and city parks and in front yards were the most important places to have trees. Unfortunately, their opinion followed with industrial areas and downtown areas. What they are saying is that where they live is where they would like to have the opportunity to have trees in more abundance.

We are going to hear how trees are actually more cost effective, and I will not go into that detail. We need to understand more of the things about how trees, in fact, do affect the environment, but we will hear more about that. One thing that I would like very much to see is an opportunity not only to work with very specific small problems, but to have an opportunity to put in some large scale model demonstration projects where we could actually create a large area, several square city blocks, several or many, where we could actually establish a model ideal program that we could begin to answer a lot of these questions in a very practical way.

Now to give you some idea about the status of tree care in cities, I would like to go into some detail from the most recent survey that we did that was presented in 1988. We found that only 39 percent of the cities in the United States manage their trees on a systematic basis, only 39 percent. Imagine a storekeeper managing his store on just a completely random basis with basically nothing. We found that only 27 percent of our cities had an emergency preparedness plan. In the event of a tornado or hurricane or whatever disaster, only 27 percent of the cities were prepared to deal with trees.

Disappointingly, even worse, only 15 percent have an urban forestry management plan whether written or whether just in someone's head. Only 15 percent admit to having a plan for what to do with their trees. Surprisingly, only 38 percent of the city tree managers know how many trees they have. Only 38 percent know how many trees they have. It makes it very difficult and risky to estimate how many trees there are nationally, but being a researcher, I took the opportunity to use those 38 percent and estimate that we have approximately 60 million trees in the United States along city streets.

Also, we could estimate that there are probably another 60 million spaces available to plant trees along those city streets. If these

trees were planted, we could certainly do a lot to ameliorate these urban heat islands and cool streets and improve the environment generally.

What we do not know is anything about the yard trees. We know about the street trees. We basically do not know anything about park trees, or very little. We know next to nothing about yard trees and the rest of this urban forest, again, that 75 to 80 percent of our citizens live near. They affect it, they are affected by this forest. So only very little information is known about this.

Other things we find from the survey is that we have very dangerously low diversity of the trees that we plant. Cities by and large are planting one tree or 2 or 3 tree species. These are all that are available. We need a lot of research to find out what other trees are available to possibly do some plant exploring, to do some plant genetic improvement so that we will have these trees to plant in these areas.

Basically we need to know an awful lot more about the trees that are in our cities and especially those that we find along the city streets. We are trying to do this right now in conjunction with the State foresters. And even with their help, we are finding that there is just not enough funding to go around. We cannot get the State foresters because of other priorities, we cannot get enough assistance to do surveys, sample surveys in 20 cities in each of 20 States. It is very difficult. We are struggling very much to obtain even that much information. This is what a dearth of funding there is for this.

I commend this bill. I would like to make a couple of small suggestions, and I think they have already been addressed, but I would like to reconfirm this, that we need funding. There is funding represented in the bill, but as I see it, it is a study of needed funding. I would like to see some money made immediately available in the bill for competitive grants to do the sorts of things that I have talked about here and that my colleagues will speak to.

Second, in order to provide the educational link between research and technical assistance, I think that we need to make allowance or have the opportunity for the Cooperative Extension Service activities to intervene between research and the technical assistance delivery. Ideally, Cooperative Forestry Act, P.L. 95-313, and the Renewable Resource Extension Act, P.L. 95-306, I think should be amended so as to enable us to have the best delivery system, to have research delivered in that way down to the technical assistance deliverers.

If we are to improve survivability and management and the consequent contributions of trees to the quality of the urban environment and to the physical and psychological well-being of over 75 percent of our population living there, more research must be undertaken. Unfortunately, at this time, there is not much funding available for work specifically in cities with city trees. Thank you.

[The prepared statement of Mr. Kielbaso appears at the conclusion of the hearing.]

Mr. VOLKMER. Thank you very much. Dr. Akbari.

STATEMENT OF HASHEM AKBARI, ENERGY ANALYST, HEAT
ISLAND PROJECT, LAWRENCE BERKELEY LABORATORY

Mr. AKBARI. Mr. Chairman, with your permission, I would like to take 15 seconds to set up my Vu-Graphs.

Mr. VOLKMER. Dr. Akbari, let me ask you a question. How many Vu-Graphs do you actually have?

Mr. AKBARI. Just five.

Mr. VOLKMER. You have five. I was wondering, if we are not able to get it focused, we could have printed matter from that Vu-Graph, put in the record.

Mr. AKBARI. I have copies of these things in my testimony.

Mr. VOLKMER. You have copies in your testimony?

Mr. AKBARI. That is correct, yes.

Mr. VOLKMER. Then we can all see it and it will be part of the record.

Mr. AKBARI. We will go that way.

Mr. VOLKMER. If we had known before, we could possibly have had a screen here, but we do not have any available at this time.

Mr. AKBARI. That is quite all right, Mr. Chairman.

I would like to mention first of all that I am here as an energy analyst, and my interest in trees and white surfaces is coming exactly from that point of view. This morning we have heard a couple of people who have been talking about urban trees being 15 times more efficient than forest or rural trees in reducing atmospheric carbon dioxide emission. I would like to place my statement in the record to show why urban trees are more efficient in reducing the rate of the carbon emission.

Mr. VOLKMER. Your prepared statement will be placed in the record at this point.

[The prepared statement of Mr. Akbari follows; hearing continues on page 76.]

URBAN TREES AND WHITE SURFACE
FOR
SAVING ENERGY AND REDUCING ATMOSPHERIC POLLUTION†

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Hearing on:
Urban and Community Forestry Act of 1989
Subcommittee on Forests, Family Farms, and Energy
Chairman: Harold L. Volkmer
Committee on Agriculture
U.S. House of Representatives

June 7, 1989

† The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof or The Regents of the University of California or Lawrence Berkeley Laboratory and shall not be used for advertising or product endorsement purposes.

‡ Also, Professor of Physics, University of California, Berkeley.

ABSTRACT

Most American cities are now "Heat Islands," whose downtown summer temperatures have been steadily warming up 0.5-1°F per decade. There is no evidence that this rise is moderating, and global greenhouse warming will likely add a comparable rise. We estimate that 5-10% of urban electric demand today is for additional air conditioning to compensate for heat islands, costing rate payers \$1 billion per year. Furthermore, in major cities, there are no smog episodes for temperature below about 70°F, but smog becomes unacceptable by 90°F, so a rise of 10°F, because of past and future heat island effects, is very significant.

White surfaces, shade trees, and street/park trees are three effective measures to reduce the summer heat island effect. White surfaces are the most effective and least expensive measure. Trees which directly shade buildings are twice as efficient as street/park trees in reducing air conditioning. An aggressive research program and beginning of "whitening and greening" can advance heat islands mitigation by ten years, saving \$10B in energy cost, and \$20B in avoided generation and air conditioning investments.

I. INTRODUCTION

We discuss urban trees and white surfaces in three parts: heat island effects, heat island mitigation, and policy issues. Information on the the magnitude and cost of heat islands are obtained using excerpts from Akbari et al (1989) (Paper 1) and their mitigation using Akbari et al (1988) (Paper 2). Our expertise is only in energy efficiency and we discuss trees and white surfaces from this point of view.

II. HEAT ISLAND EFFECTS (Paper 1)

Before mechanical air conditioning, people cooled their homes in the summer by surrounding them with trees and painting the walls and roofs white. The disappearance of such practices increases the cooling demand of a home by ~1kW, and if the home is urban, contributes to a summer 5°F heat island.

Figure 1 depicts Los Angeles temperature highs between the 1870's and 1984. We see a pre-'40's cooling trend and a post-'40's warming trend. Downtown Los Angeles's high temperatures are now 5-6°F higher than they were in 1940. Figure 2 details the post-40's warming trend in further detail. We can see that the summer months' average temperature slopes are actually increasing over 1°F/decade.

The Los Angeles Basin is served by two utilities: Southern California Edison (SCE) with a capacity of ~15GW and Los Angeles Department of Water and Power (LADWP) with a capacity of ~5GW. Figure 3 depicts SCE's 4 pm electrical load versus average daily temperature for 365 days in 1986. We see that peak demand increases by 225 MW/°F or about 1.6%/°F. If we add this to the LADWP slope (75 MW/°F), the total slope reaches 300 MW/°F, and for the 5 °F rise since 1940, that means ~ 1.5 GW of heat island-dependent load. If peak electricity is worth 10 ¢/kWh, then this represents \$150,000/°F for each hour. Figure 4 shows a comparable heat island in Washington, D.C.

Not only does the heat island increase city-scale cooling loads, but it also increases the probability of smog episodes, brought on by the higher urban temperatures. Figure 5 shows the daily maxima in ozone levels (a measure of smog) for Los Angeles. We see that below ~70°F, smog never exceeds the National Atmospheric Air Quality Standard (NAAQS), but at ~90°F, smog levels are more than twice of NAAQS. Restated, smog goes from tolerable (!) to intolerable in just 20°F, of which one fourth is already attributable to the heat island effect.

III. HEAT ISLAND MITIGATION (Paper 2)

Urban light-colored surfaces and trees are two proven and inexpensive measures to reduce summer heat islands and even create summer oases. Trees improve the urban climate and, by shading and evapotranspiration, reduce summer cooling energy use in buildings at only about 1% of the capital cost of the avoided power plants and air conditioning equipment. Using light-colored paints and surfacing the asphalt of streets and parking lots with whitish aggregate and sand are even more effective.

In addition to saving energy, urban trees and light-colored surfaces are the most cost-effective ways to indirectly slow the growth of atmospheric CO_2 . By reducing the need to burn fossil fuels for generating electricity, urban trees are indirectly about 15 times more efficient at sequestering CO_2 than is rural forestation.

Our calculations indicate that light-colored surfaces and urban trees can save 0.5 quad per year with a payback time of 0.3 to 1.8 years, and decrease CO_2 emissions by about 17 million tons of carbon per year. (See Table 1.)

Of three possible options: white surfaces, shade trees, and street/park trees, white surfaces are the most effective and least expensive measure. More than half of the savings shown in Table 1 are due to white surfaces. Cities can be whitened rather easily. Most buildings and flat roofs are painted (or resurfaced) every 10 years; in their next cycle, they can be painted white.

Also, on streets and parking lots, whiter asphalts and concrete can cover blacktop at low or zero incremental cost. Furthermore, for new buildings, colors can be easily incorporated into building codes.

The other half of the savings from the combination of the direct and indirect effects shown in Table 1 are from the planting of 100 million urban trees. This annual savings of 0.25 quads (22 billion kWh) corresponds to a savings of 8 million tons of burned carbon. A fast-growing tree sequesters carbon from the atmosphere at the rate of ~13 lb per year. Therefore, 100 million forest trees will sequester 0.65 million tons of carbon from the atmosphere, which is only 1/15th of the carbon saved by the same number of urban trees through their reduction in cooling energy use. Another way of looking at this is that to sequester from the atmosphere the same amount of carbon saved by the planting of 100 million urban trees would require planting of 1.5 billion forest trees corresponding to 1.5 million hectares of forest (a hectare is 2.5 acres, and the total area of Connecticut is about 1.3 million hectares).

Since shade trees are twice as effective as street/park trees in reducing air conditioning, more attention should be given to trees which directly shade residential, small commercial, and industrial buildings. An economic comparison of shade trees, street/park trees, and rural trees is needed for the design of an effective heat island mitigation and CO_2 sequestering program. We estimate that an aggressive research program and the beginning of whitening and greening can advance the heat island mitigation by ten years, saving \$10B in electric bills and over \$20B in avoided generation and air conditioning investments.

IV. POLICY ISSUES

Although we have scoped and preliminary ranked the heat island mitigation measures, research is needed to understand many aspects of these measures:

1. White Surfaces and Trees—Trees cool the city by evapotranspiration, but they only reflect 20 to 25 percent of incident solar radiation. We need to study the optimal combination of white surfaces and trees.
2. Direct and Indirect Savings—Presently, we can model the direct savings of white surfaces and trees using building energy simulation codes. Further research is needed to model indirect savings.
3. Shade Trees, Street/Park Trees, and Rural Trees—Trees save cooling energy and reduce atmospheric CO_2 pollution. We already know that it is very cost effective to plant trees

which shade buildings directly. In addition to their direct effects, shade trees would also contribute to heat island mitigation by evapotranspiration. Trees on streets, highways, and parks save energy only by mitigating heat islands, hence they are only half as effective as shade trees. Rural trees do not save energy, but they sequester CO_2 from the atmosphere, they are inexpensive, and they have a high rate of survival. We need to compare the economics of all three types of trees, in several locations.

4. Heat Island Mitigation Manual—There is need for a manual on reducing heat islands. In our opinion, such a manual would be the best way to advise state or local government, or utility programs to start reducing heat islands. EPA, the Electric Power Research Institute (EPRI), and UC/UERG (the University of California, Universitywide Energy Research Group) are funding the initial efforts of this manual. Support is needed for completion and continued updating of the manual.
5. Demonstration and Monitoring— After the manual, we view the next priority to be to demonstrate the cost effectiveness of shading and painting school buildings in many cities. LADWP has already agreed to help us work with the Los Angeles Unified School District to shade and paint some portable "bungalow" schools, and measure the payback times. We will also lighten blacktop playgrounds, using chalk or some equivalent non-abrasive light colored material. The sooner we can compile a list of such experiments, the faster communities can be convinced to take part.

ACKNOWLEDGEMENT

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- (Paper 2:) Akbari, H., Huang, J., Martien, P., Rainer, L., Rosenfeld, A., and Taha, H. 1988. "The Impact of Summer Heat Islands on Cooling Energy Consumption and Global CO_2 Concentration," *Proceeding of ACEEE 1988 Summer Study on Energy Efficiency in Buildings*, Vol 5, pp11-23, Asilomar CA, August, 1988.

Table 1. Yearly savings (by 100 million trees/white surfaces) of primary energy used for air conditioning in the U.S. and consequent reductions in released carbon*.

	Residential **			Small Commercial †			Large Commercial ‡			Total	
	Energy (%)(10 ¹⁵ Btu)	Carbon (M Tons)		Energy (%)(10 ¹⁵ Btu)	Carbon (M Tons)		Energy (%)(10 ¹⁵ Btu)	Carbon (M Tons)		Energy (10 ¹⁵ Btu)	Carbon (M Tons)
Direct Savings	10	0.12	4	4	0.03	1	0	0.0	0	0.15	5
Indirect Savings	20	0.23	8	12	0.09	3	5	0.04	1	0.36	12
Total	30	0.35			0.12	4	5	0.03	1	0.51	17

* Production of carbon (as CO₂) from a peak power plant assumes 11,600 Btu/kWh sold, and ~14,500 Btu/lb. of carbon.

** Residential. US annual residential cooling electricity use is ~100 BkWh/yr, corresponding to 1.2 quads. We assumed 3 trees (plus light surfaces) for 50% of our 50 million air conditioned homes, so 75 million trees (plus light surfaces).

† Small Commercial. US uses 65 BkWh (= 0.75 quad). We assumed 30% coverage by trees (25 million more trees).

‡ Large Commercial. US uses 65 BkWh (= 0.75 quad). We assumed no additional trees.

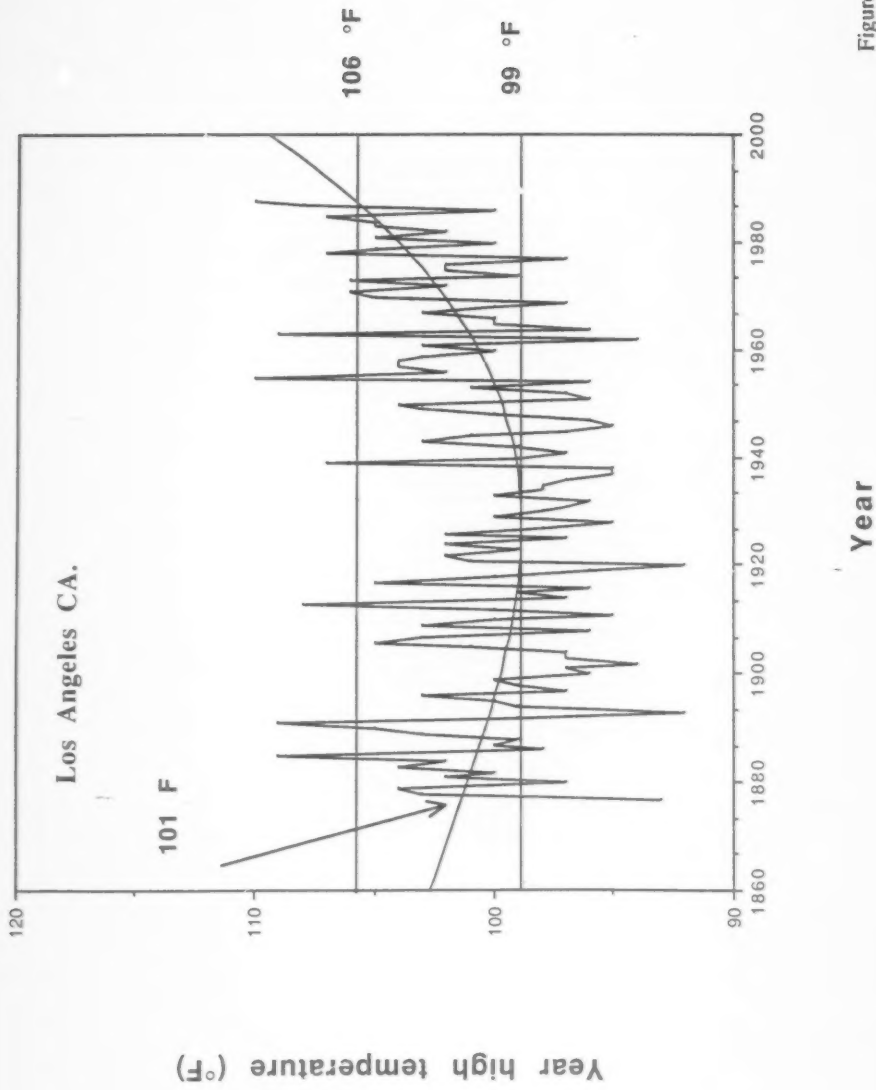


Figure 1.

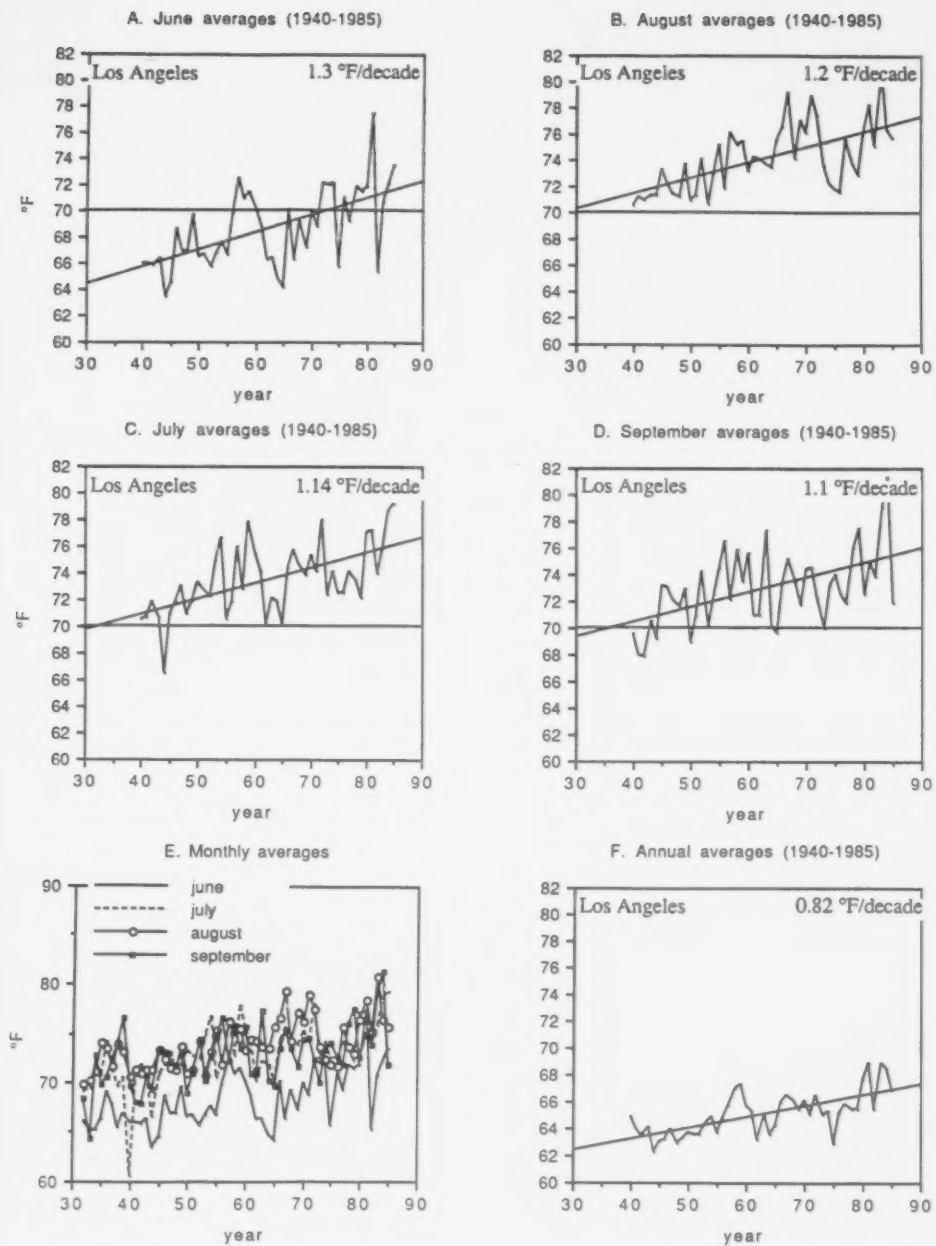


Figure 2.

4 pm Load of the S.C. Edison versus Downtown Los Angeles

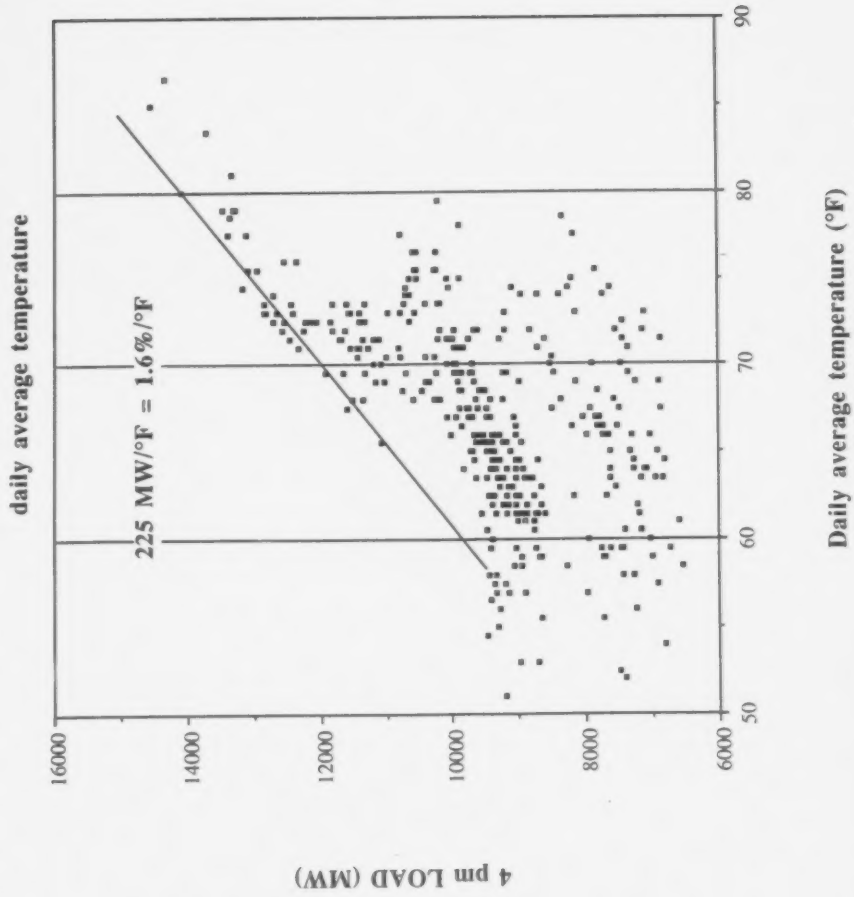


Figure 3.

Washington Annual Mean Temperature
1871 - 1987

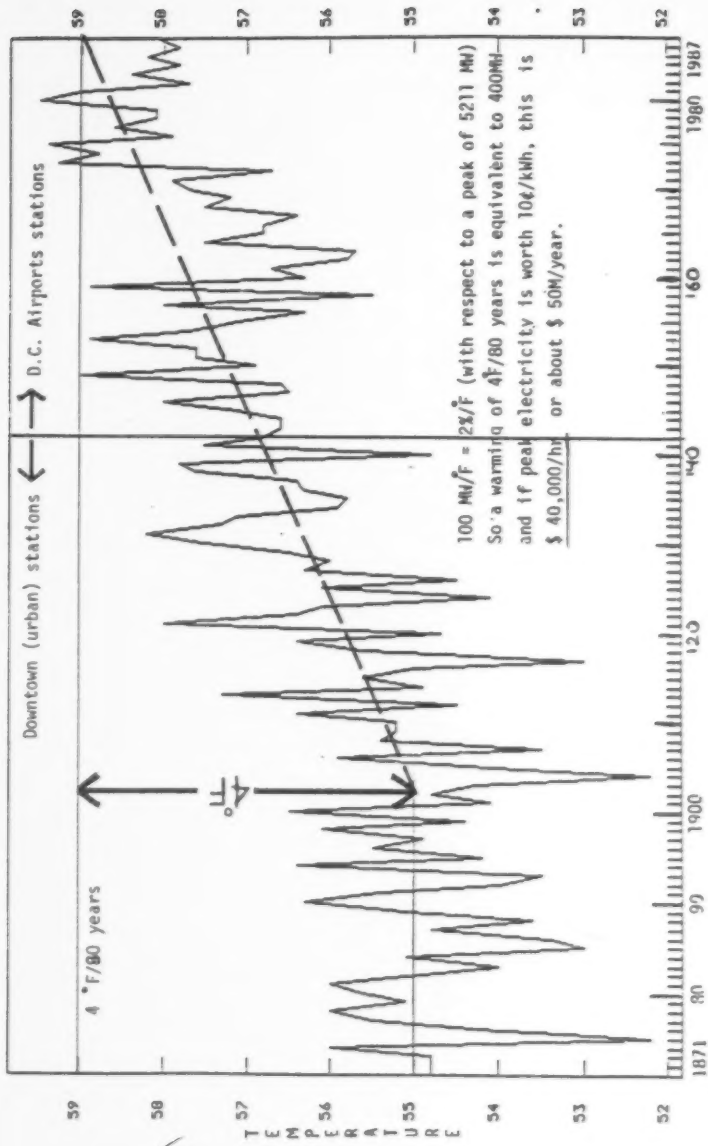
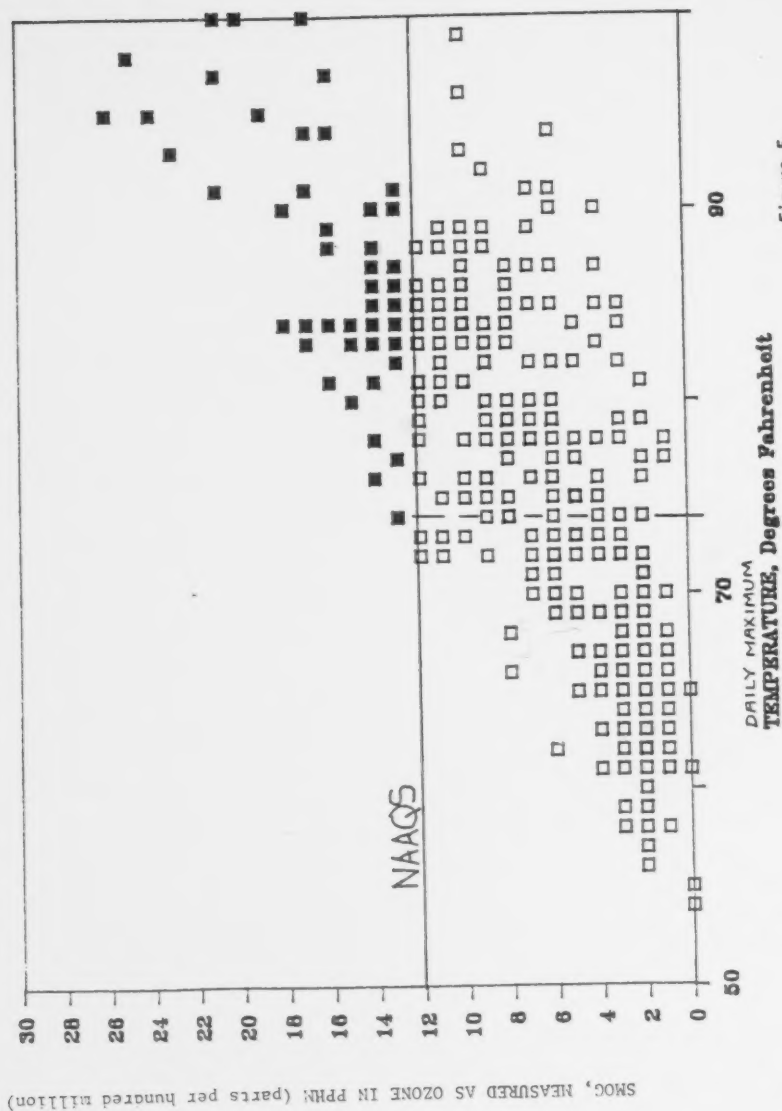


Figure 4.

1985 Los Angeles, North Main



Presented at the Heat Island Workshop,
Berkeley CA, Feb. 23-24, 1989.

DRAFT

Recent Development in Heat Island Studies: Technical and Policy.

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ABSTRACT

This paper summarizes the recent work at LBL to quantify the effects of summer heat islands on the utilities' electric load and urban smog, both on the short and long terms. We have started to analyze 100-year temperature trends for several large cities. Since about 1940 there has been a steady increase in downtown temperatures of 0.25-1°F per decade (~1°F for larger cities like Los Angeles and 0.25°F for smaller cities). There is no evidence that this rise is moderating, and of course global greenhouse warming will add a comparable rise. Typical electric demand of cities increases 1-2%/°F, and most major cities are now ~5°F warmer than they were in the early 1900's. Hence, we estimate that about 5-10% of the current urban electric demand is spent to cool buildings just to compensate for the heat island effect. Downtown Los Angeles is now 5 °F hotter than in 1940 and so L.A. Basin demand is up by 1500 MW, worth \$ 150,000 per hour on a hot afternoon (the equivalent national bill is ~ \$ 1M/hour). In major cities, there are no smog episodes below about 70°F, and smog becomes unacceptable by 90°F, so a rise of 10°F, because of past and future heat island effects, is very significant.

INTRODUCTION

In cooling-dominated climates, summer urban heat islands significantly increase cooling energy use and peak demand. On the long range, cities are warming compared to sub-urban and rural surroundings [Karl et al. 1988, Kukla et al. 1986], and as we show in this paper, this long term warming is responsible for an increase of 1-2% in cooling loads (with respect to the peak) for each degree °F. As temperature rises, so does the severity of smog and the production of other airborne pollutants.

The objective of this paper is to track the long term temperature trends in major U.S. cities and present snapshots of temperature-dependent loads in some of them. We do so in order to propose some heat island mitigation strategies to reduce smog and the need for cooling energy.

LONG TERM TEMPERATURE TRENDS IN SELECTED CITIES

In this paper, we have relied on long term heat island data bases from the Carbon Dioxide Information Analysis Center [CDIAC 1987], California data [Goodridge 1987,1989], and some load/temperature information. The data we present here have been adjusted for station moves (relocation), change of height, time of observation bias, change in type of instruments, and discontinuity in record [Karl et al. 1986,1987]. They have not been corrected for urban (population) effects.

We first present Los Angeles, a large metropolis with a mild to warm climate. Figure 1 depicts the temperature highs between 1870's and 1984. A polynomial has been fitted to the data to highlight the mean trend. We can see that ~1940 was a dividing year between the pre-40's cooling trend and the post-40's warming. Downtown Los Angeles was cooling at a rate of 0.046 °F/year up to 1940 and then started a steady warming of 0.13 °F/year (1.3 °F/decade) afterwards. In other words, Downtown Los Angeles's high temperatures are now 6.5 °F higher than they were in 1940. In Figure 2 we study the post-40's warming trend in further detail. We can see that the summer months' average temperature slopes are in the range of 0.11 - 0.13 (± 0.02) °F/year. The annual plot shows a smaller slope, indicating that winter temperatures are rising more slowly.

Figure 3 depicts the long term temperature trend (annual mean) in Washington D.C. between 1871 and 1987. We can see that after 1900, there is a steady rise of 0.5 °F/decade and that the total rise over 80 years is about 4 °F. Contrary to Los Angeles, whose temperatures were all urban (Figures 1 and 2), Washington D.C.'s urban stations moved to airport locations about 1942¹.

Our data indicate that this recent warming trend is typical of most U.S. metropolitan areas. As an example, we discuss some California cities. Figure 4 [Goodridge 1989] shows that before 1940, the urban-rural temperature differences in 31 urban and 31 rural stations in California were always negative, that is: cities were cooler than their surroundings (both annual and 10-year averages show this). We

¹Up to 1942, the data are for Downtown Washington weather stations, but after 1942, the recording stations moved to official locations in airports. Figure 3 thus depicts data from different locations. So while we need urban heat island information, the last forty years provide us with airport data (adjusted or unadjusted), which may underestimate the urban effects, because cities warm up faster than the suburbs, where airports are usually located. This is not only the case with Washington D.C., but also with most major cities in the U.S. We are not aware, at this time, of any continuous urban temperature data base for the last 100 years (except for Los Angeles CA), and we believe that monitoring of this kind should be undertaken, if city-wide energy use is to be better understood and mitigation strategies properly applied.

speculate that this is a result of the oasis effect in the vegetated city centers. After 1940, the urban centers became as warm or warmer than the suburbs, and the trend becomes quite obvious after 1965, where the slope is about $0.67^{\circ}\text{F/decade}$. The heat island effect has thus become dominant in these urban areas.

Figure 5 [Goodridge 1989] shows the spatial distribution of temperature trends in California. The areas near San Diego, Los Angeles, San Francisco, and Sacramento have trends exceeding $0.4^{\circ}\text{F/decade}$; it will take them less than 25 years to become 1°F warmer than before. For example, the August warming trends in San Diego CA and San Bernardino CA, are respectively $0.8^{\circ}\text{F/decade}$ and $0.6^{\circ}\text{F/decade}$. Maximum temperatures in Davis CA ($0.85^{\circ}\text{F/decade}$) and Pasadena CA ($0.86^{\circ}\text{F/decade}$) also show these trends.

In the near future, we will be studying in more detail the long term heat island trends in large cities such as New York NY, Atlanta GA, St. Louis MO, Houston TX, and Miami FL. This compilation is further complicated by the gap in urban climate data. Most cities reported downtown data up to the 40's (60's at latest) after which, the stations moved to airports. As mentioned earlier (Washington D.C. example, footnote 1), there is need to better monitor the urban climates for heat island mitigation objectives.

COOLING LOADS VERSUS TEMPERATURE: EXAMPLES FOR 1986

We study the dependence of cooling loads on the heat island intensity by examining some "snapshot" data². In this paper we discuss examples from the Los Angeles Department of Water and Power (LADWP), Southern California Edison (SCE) System, and Washington D.C.

Figures 6a,b depict the data for Los Angeles. In Figure 6a, 4 pm load is plotted against 4 pm temperature for 365 days in 1986. We can distinguish between some weekend scatter, base load scatter, and temperature-dependent cooling load. The slope of peak demand is $71.5 \text{ MW}/^{\circ}\text{F}$ ($2\%/^{\circ}\text{F}$). In Figure 6b, the same procedure is repeated by plotting peak load (at 4pm) versus average daily temperature, for 365 days in 1986. The same overall pattern prevails, but the temperature-dependent cooling load is now better defined. The slope becomes $75 \text{ MW}/^{\circ}\text{F}$, still about $2\%/^{\circ}\text{F}$. If we use the data from Figure 2, whereby the city of Los Angeles has warmed by $\sim 5^{\circ}\text{F}$ since 1940, then this means that we have incurred an increase of 375 MW or 10% of the current peak load.

In Figure 7, a similar plot is constructed for the Southern California Edison (SCE) System³ whereby the 4pm loads are plotted against the daily average temperatures for 365 days in 1986. Although other temperature points within the Edison system area were available, we plotted the SCE load data against the downtown temperatures, so we can consistently compare the snapshot interval⁴ with the long range trend shown in Figures 1 and 2.

²We chose 1986 because weather tapes and load data are already available.

³The SCE system area surrounds Los Angeles but does not include the city itself, which is serviced by LADWP.

⁴To study peak load/temperature dependence, an appropriate method is to use 4pm temperatures over the period of interest, as was the case in Figure 6a. But hourly data are not easily available for long term periods, i.e. the last 100 years; only daily or monthly averages can be found. The use of the average is thus justified, and we have shown that in Figure 6b. We saw that there was no major change in the slope, compared to Figure 6a. When the SCE load was plotted against Downtown LA temperatures (Figure 7), it resulted in a similar pattern. We will be using temperature averages in our analysis of load/temperature data for other locations, as well.

We can see in Figure 7 that the peak slopes at 225 MW/°F or about 1.6%/°F. If we add this to the LADWP slope (75 MW/°F), the total slope reaches 300 MW/°F, and for the 5 °F rise since 1940, that means ~ 1.5 GW of heat island-dependent load. If peak electricity is worth 10 ¢/kWh, then this represents 150,000 \$/°F for each hour.

For Washington D.C. (Figure 3), the slope is 100 MW/°F (2%/°F of the 5211 MW peak). So for an increase of 4 °F/80 years, this is an additional 400 MW, and at 10¢/kWh, this is \$40,000/hr. There are about 1300 hours of air-conditioning in D.C., yielding ~ \$50M every year.

We now discuss the relation between heat islands, which are easily controlled, and global warming, which will probably add another 0.5-1 °F/decade before it is brought under control. The pessimistic scenario is that the two effects will add, thus doubling the discomfort and expense in large cities; our more optimistic and activist proposal is to reduce heat islands fast enough to offset global warming. Since we have already seen an hourly cost of \$ 150,000 for the Los Angeles Basin, and \$ 40,000 for Washington D.C., we estimate that the hourly cost of all the heat islands in the U.S. is of order of magnitude \$ 1 million. Hence our proposal to offset global warming in these hot cities is very attractive both in terms of human comfort and dollar savings.

All these numbers indicate that huge savings can be attained by mitigating summer heat islands. This is the general objective of the Heat Island Program at LBL. With the climatic and load data we are now compiling, we shall be able to better estimate the impact of heat island mitigation strategies as energy conservation measures.

SMOG LEVELS VERSUS TEMPERATURE IN SELECTED CITIES

Not only does the heat island increase city-scale cooling loads, but it also increases the amount of smog, brought on by the higher urban temperatures. Figures 8 and 9 show the daily maxima in ozone (O_3) levels for Los Angeles and Texas. In Figure 3, we see that below 74 °F, smog never exceeds the National Atmospheric Air Quality Standard (NAAQS), but by 94 °F, smog levels are too high (~ 26 pphm). Restated, smog is very sensitive to 20 °F of which, one fourth is already attributable to the heat island effect. Figure 9 shows similar results for 13 cities throughout Texas [Argento 1988].

Smog globally.

We are not yet clear which will be the greater force for controlling heat islands - greed to save electricity or desperation to reduce smog. In many hot cities outside the U.S., where air conditioning is less prevalent, it may well be smog. We'd be very interested to learn from conference participants of cities outside OECD where heat islands and smog are becoming a serious problem.

MITIGATION POLICY and INITIATIVES: recent developments.

1. Utility Contributions to Offset CO₂ Emissions.

In Oct. 88, Roger Sant and Roger Naill of Applied Energy Services, the DC-based vendor of cogeneration plants, announced their splendid policy of planting trees to offset the CO₂ produced by their power plants, most of which burn coal. At the time that they came up with this idea, they were unaware of the Berkeley studies of urban trees. They discovered that CARE had a successful afforestation program in Guatemala, and would be able to leverage a \$2M AES contribution by a factor of 7 and plant the 200,000 acres necessary to offset 200 MW. (The time factors cancel out of the offset because the lifetimes of trees and power plants are comparable). The final cost to plant these trees is about \$80/acre (= \$80 to offset 1 kW), which corresponds to a cost of about 1 mil per kWh equivalent of sequestered carbon. This of course assumes no land costs, whereas in the U.S. the Conservation Reserve Program is already paying \$50/acre-year for land, and Dan Dudek of EDF estimates that payments will soon double [Dudek, 88].

This raises the question of the relative cost of sequestering carbon by forest trees vs. avoiding the combustion of carbon by urban trees. We urge support of both. Urban trees are more lucrative -- they actually save money, but as we show in our papers, we can only find about 25 million U.S. homes to shade, and we can only save about half a quad. of electricity per year (half a quad corresponds to 50 BkWh, or the output of about 10 baseload one-GW power plants).

On the other hand, there are several million square miles of discretionary land available worldwide for forestation, which could offset not a puny 10 GW, but 2000 GW. So we recommend that we start getting experience with both programs. (Art Rosenfeld has written more about this in an Oct. 88 note which he calls Tree News, available from LBL).

The news on this issue, in California, is that the two ideas of offset contributions and urban trees have now been connected by former California Energy Commissioner Gene Varanini, representing a cogeneration vendor. Varanini is currently discussing this issue with the California Energy Commission. Even better, this first utility support might be offered not for trees and white paint, but to fund us researchers to start our handbook on Heat Island Mitigation, which is addressed below.

2. Bond Issues for Heat Island Reduction.

There are now at least two bills in the California Legislature for bond issues for trees/light surfaces. One of them is a Transportation Committee bill sponsored by Assemblyman Katz for \$100 M to be spent over 5 years. A similar bill has been introduced in the Assembly Committee on Natural Resources by Lloyd Connally and Byron Katz. We would be interested in learning of initiatives in other states.

3. There is need for a Handbook on Reducing Heat Islands.

In our opinion such a handbook would be the best way to advance intelligent state or local government, or utility programs to start reducing heat islands. We have already applied to UC/UERG (the UC, Universitywide Energy Research Group) for support to start such a handbook, and are actively soliciting support from any agency, institute, or foundation that will listen. App. 1 reproduces the abstract from our UERG proposal, with 10 bullets for 10 chapter headings. When we succeed in finding funds, we'll want your help in writing many of these chapters. If you would like to collaborate, let us know. We should

point out that this handbook could be a productive collaboration of several warm-weather states.

4. Comparison of Urban and Rural Trees.

The need for a chapter in this handbook comparing rural trees, and two sorts of urban trees. We already know that it is very cost effective to plant trees which shade buildings directly. Trees on streets, highways, and parks are less lucrative, although still probably very valuable. We need to compare the economics of all three sorts of trees, in several locations. This chapter will particularly interest utilities, including our friends Roger Sant and Roger Naill. In fact Sant and Naill have expressed interest in collaborating on this chapter.

5. Demonstration and Monitoring.

After the Handbook, we view the next priority to be to follow the lead of Prof. Parker, of Florida International University, who is here today, and to demonstrate the cost effectiveness of shading and painting school buildings in many cities. LADWP has already agreed to help us work with the Los Angeles Unified School District to shade and paint some portable "bungalow" schools, and measure the payback times. We even want to experiment with lightening the color of blacktop playgrounds with chalk or some equivalent non-abrasive light colored material. The sooner we can compile a list of such experiments, the faster communities can be convinced to swing into action.

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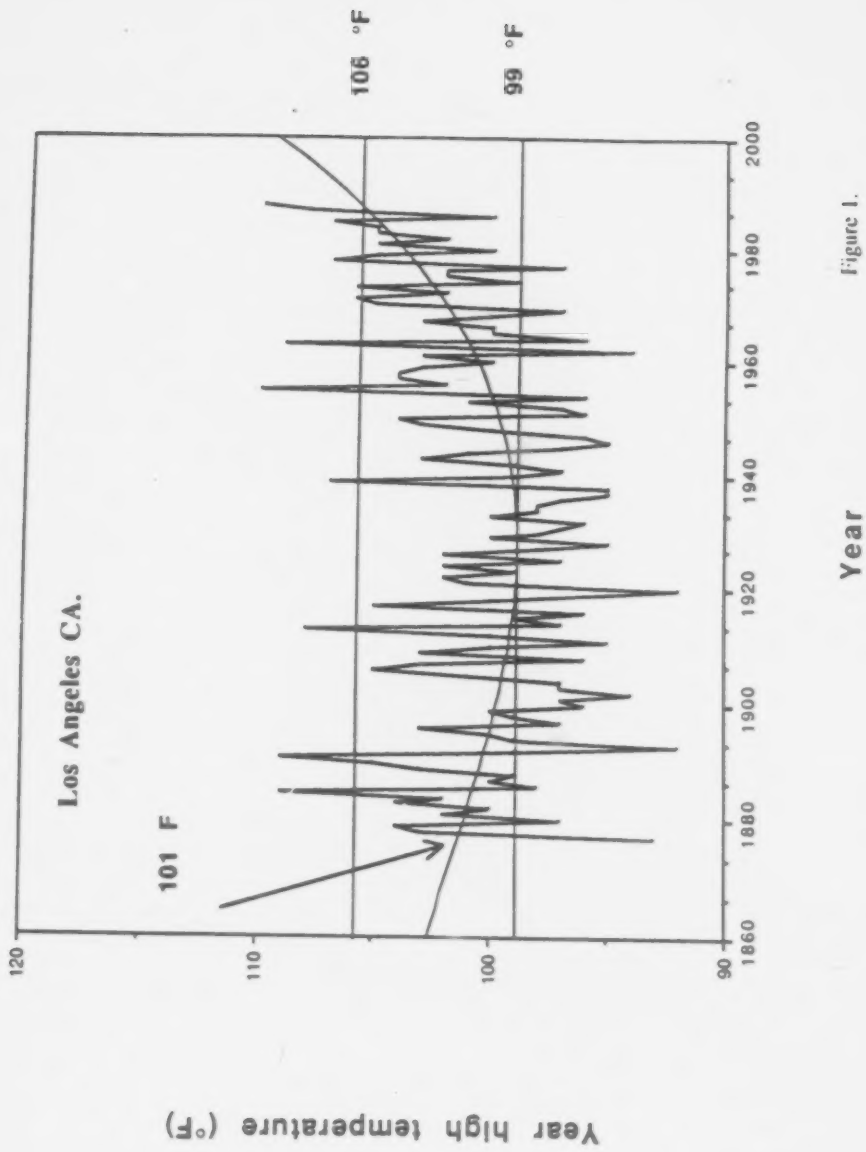


Figure 1.

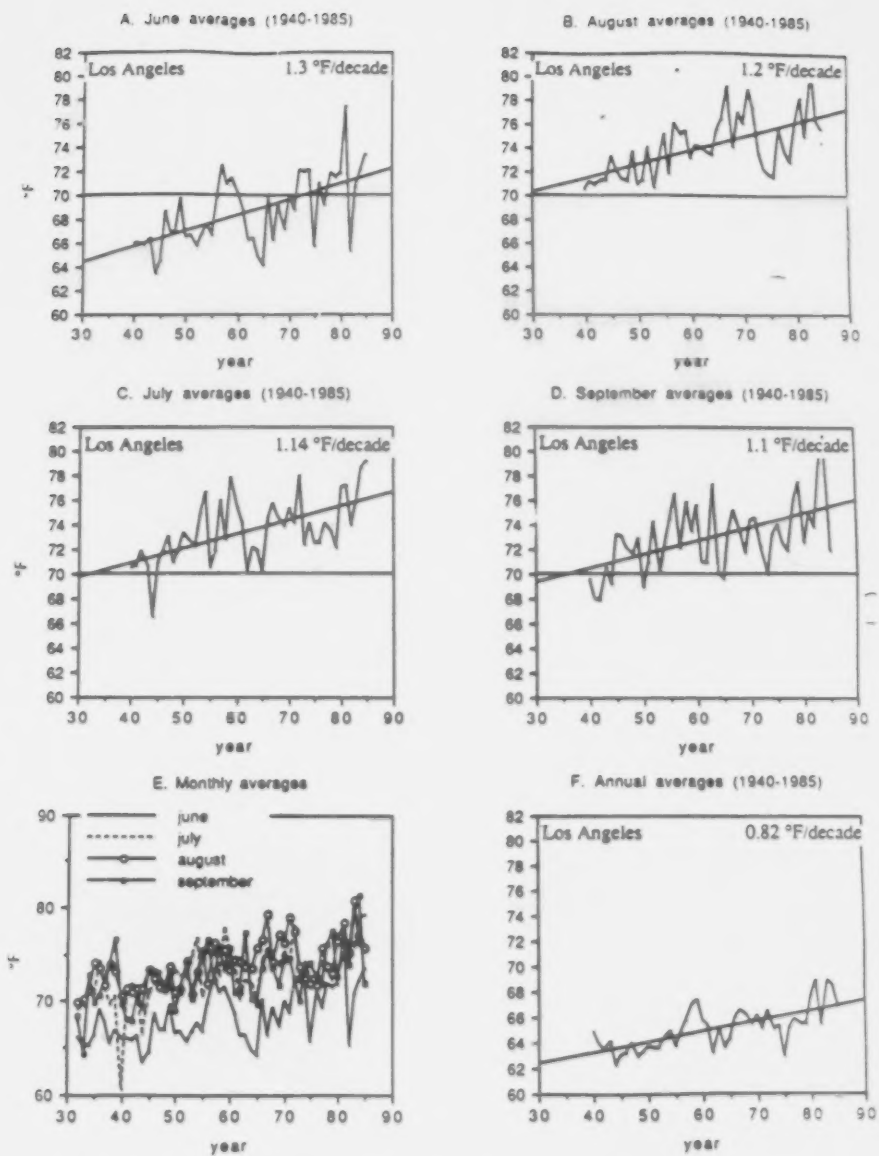


Figure 2. Four summer months of Downtown Los Angeles monthly average temperatures, showing a rise of about $5^{\circ}\text{F}/46$ years.

Washington Annual Mean Temperature
1871 - 1987

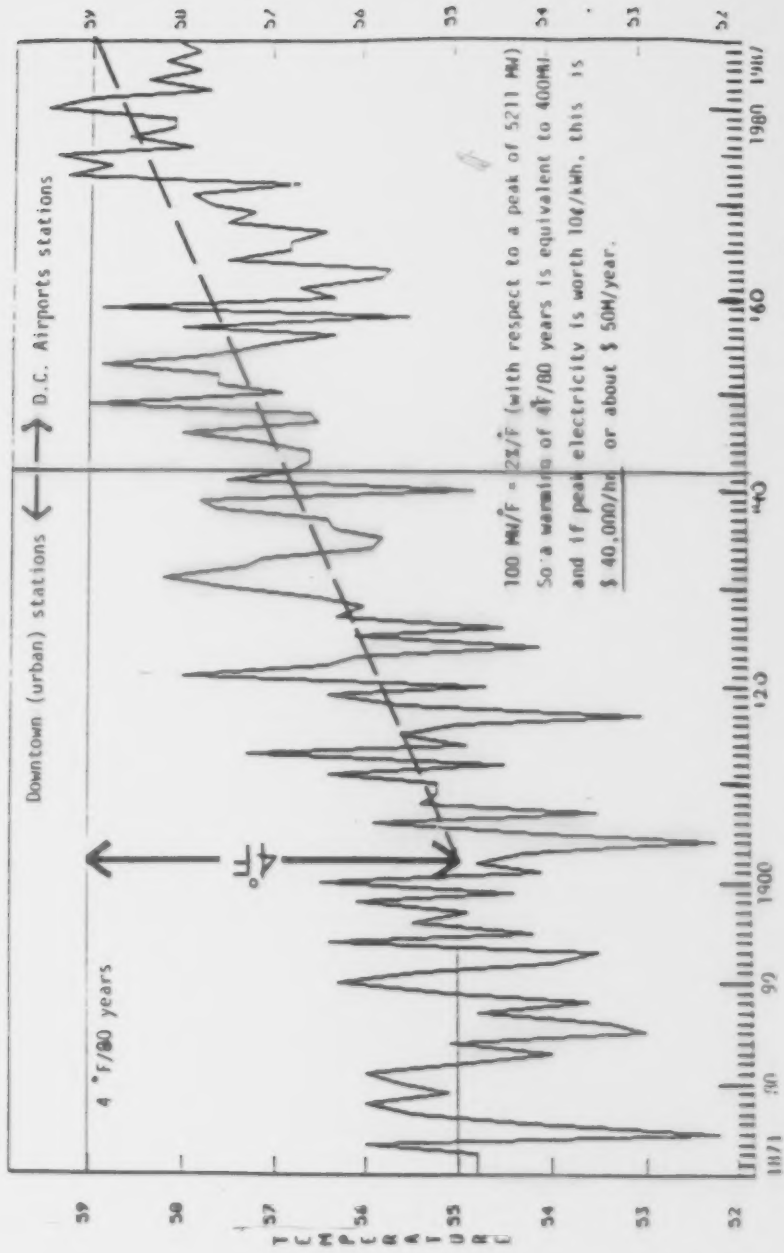


Figure 3.

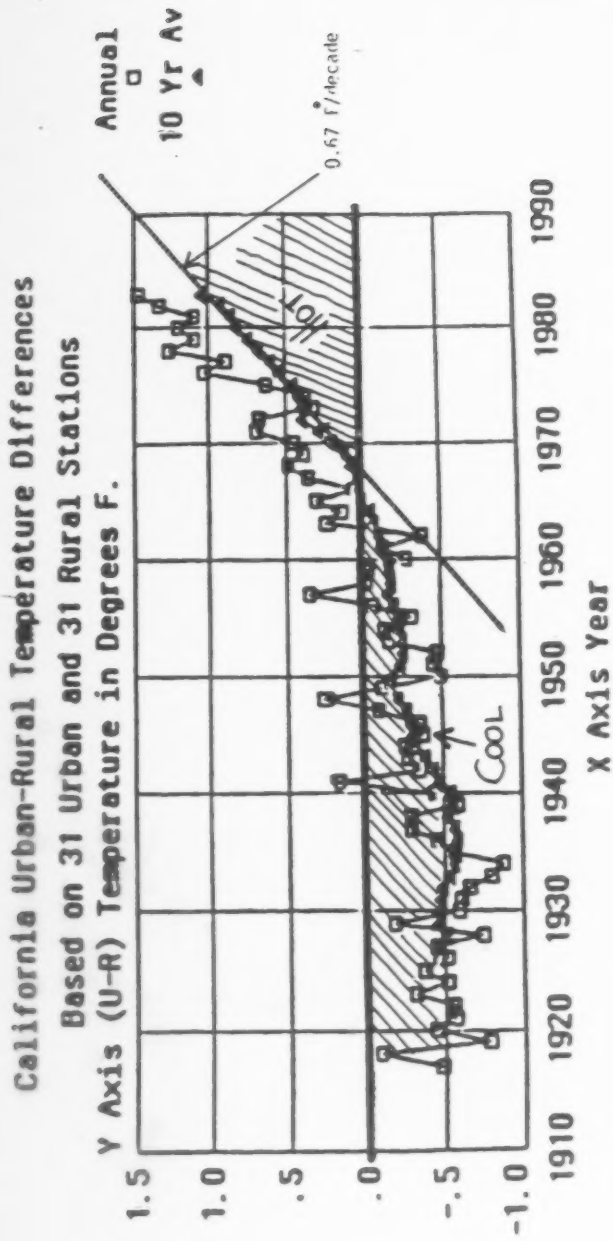
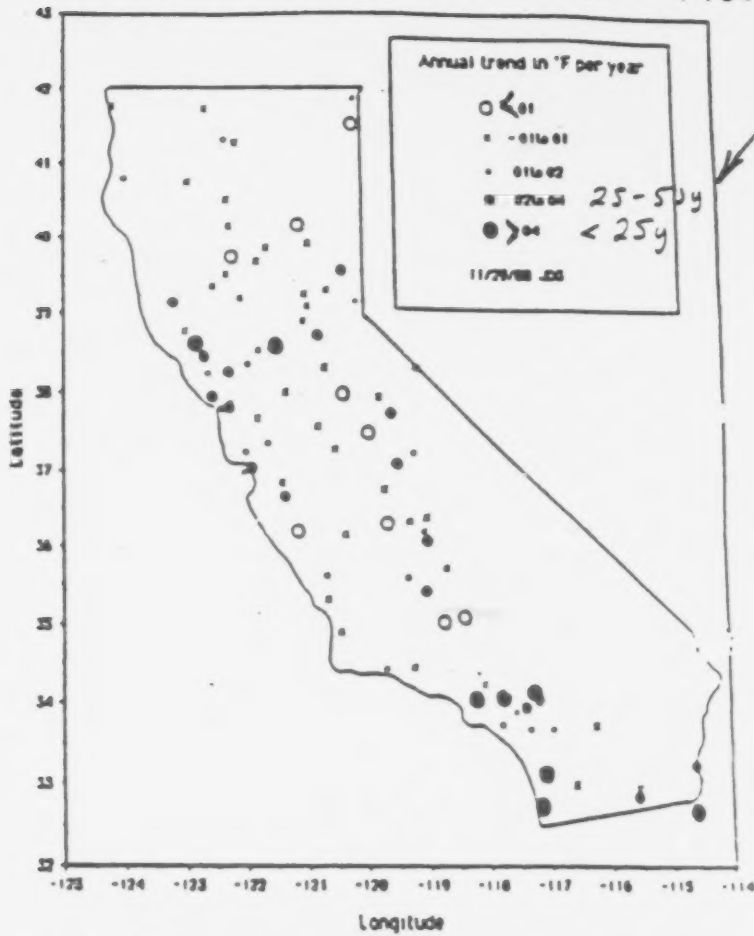


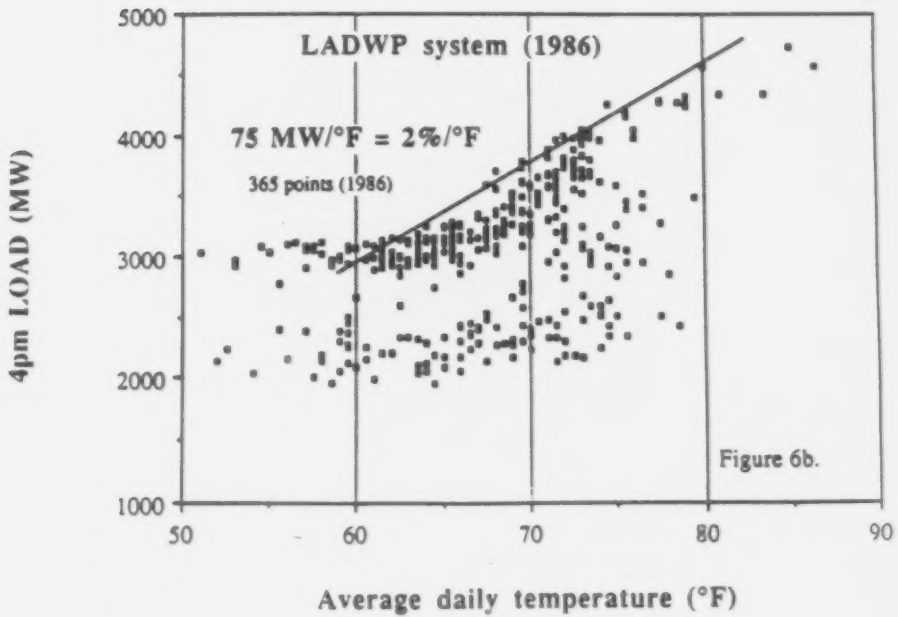
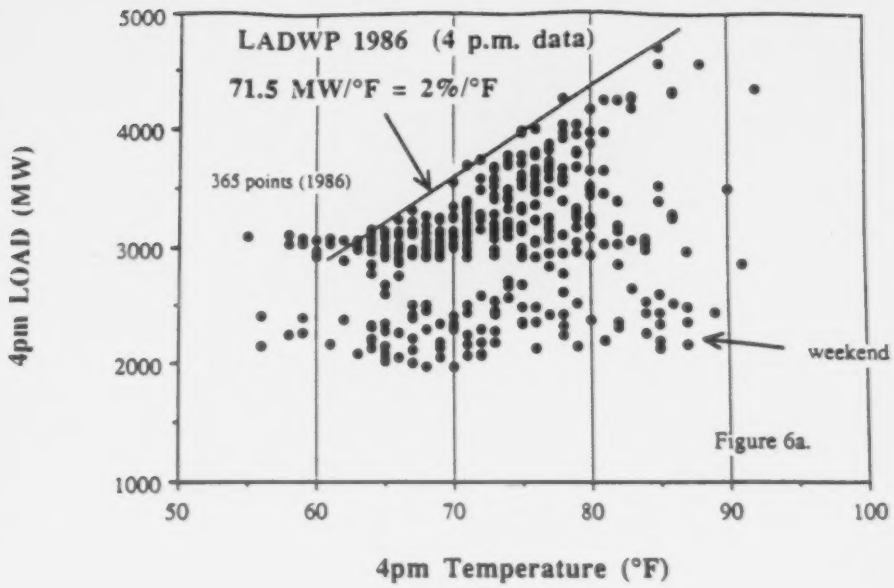
Figure 4. California temperatures. Source: Gondridge 1989.

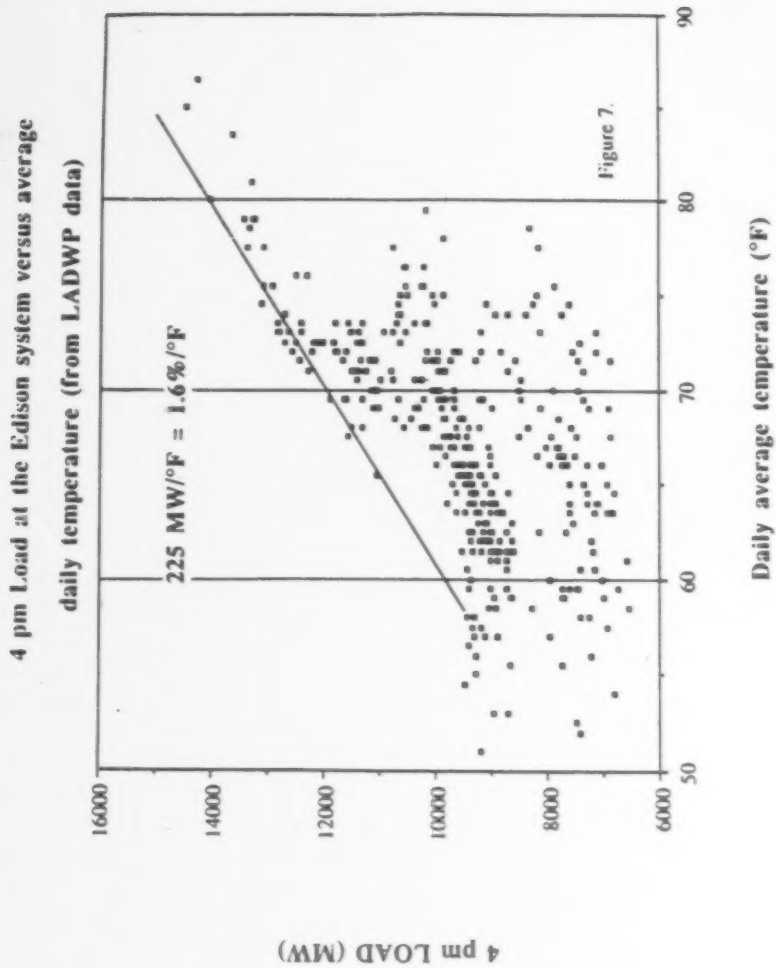
California Temperature Trends

*Time to
rise 1°F*

Based on 92 temperature records for the period 1912 to 1987

Figure 5. California temperatures. Source: Goodridge 1989.





75 MW (LADWP) + 225 MW (SCE) = 300 MW.

300 MW × 5 °F = 1500 MW, worth ~ \$150,000 per hour

1985 Los Angeles, North Main

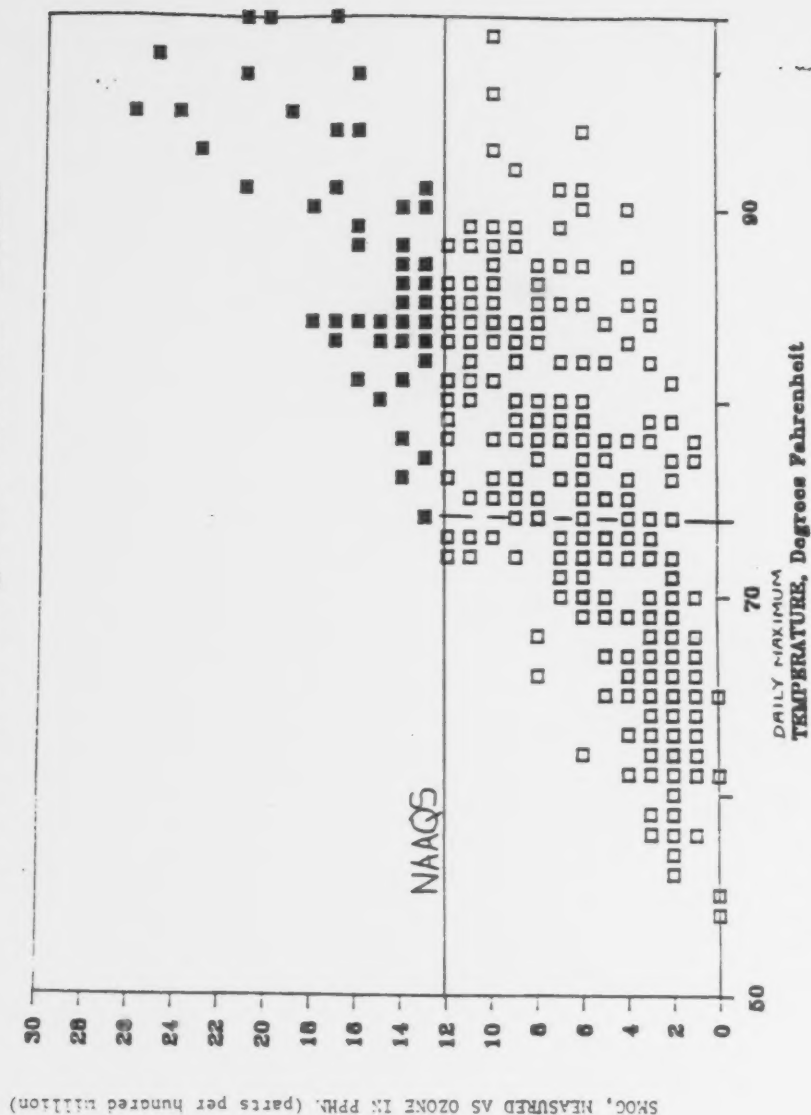


Figure 8.

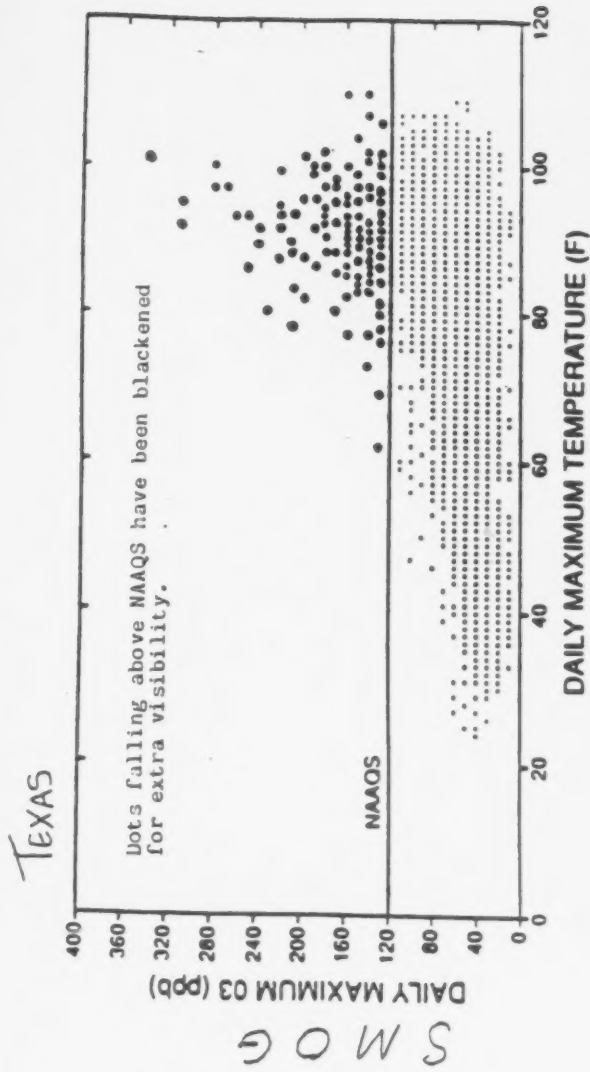


Figure 4. Maximum daily ozone concentration vs. maximum daily temperature.

Source: Chemical Engineering Progress, Dec '88, p 50
V. Armento, University of Texas, Arlington

Figure 9.

This proposal is to prepare a guidebook for control of summer heat islands to include:

- a discussion of direct air conditioning savings of heat island mitigation measures in homes, schools, hospital, and small commercial buildings;
- a discussions of methods to cool the entire city;
- a comparison of heat island mitigation technologies;
- heat island maps of California cities;
- heat island effects on smog and water usage;
- a model ordinance;
- a discussion of policy issues;
- tree selection, cost, and maintenance requirements;
- how to mobilize and pay for summer youth to plant and nurture trees;
- and how California can incorporate heat island control in environmental plans for counties and cities.

To be presented at the ACEEE Summer Study
on Energy Efficiency in Buildings,
Asilomar CA, August 1988.

LBL-25179
July 12, 1988

THE IMPACT OF SUMMER HEAT ISLANDS ON COOLING ENERGY CONSUMPTION AND CO₂ EMISSIONS

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ABSTRACT

It has been well documented that summer heat islands increase the demand for air conditioning. Several studies have suggested developing guidelines to mitigate this negative effect, on both micro- and meso-scales. Reducing summer heat islands saves cooling energy, reduces peak demand, and reduces the emission of CO₂ from electric power plants. This paper summarizes some of our efforts to quantify the effects of techniques to reduce heat islands. In particular, we summarize simulations we have made on the effects of planting trees and switching to light colored surfaces in cities. Our results indicate that these techniques effectively reduce building cooling loads and peak power in selected U.S. cities, and are the cheapest way to save energy and reduce CO₂ emissions.

This paper compares the economics of technologies to mitigate summer heat islands with other types of conservation measures. We estimate the cost of energy conserved by planting trees and recoating surfaces on a national level and compare it with the cost of energy conserved by increasing efficiencies in electrical appliances and cars. Early results indicate that the cost of energy saved by controlling heat islands is less than 1¢/kWh, more attractive than efficient electric appliances (~2¢/kWh), and far more attractive than new electric supplies (~10¢/kWh). In transportation, the cost of conserving a gallon of gasoline, though far more attractive than buying gasoline at current prices, is again more expensive than controlling heat islands. By accounting for the carbon content of the fuels used for power generation and transportation, we restate these comparisons in terms of cents per avoided pound of carbon emitted as CO₂. Our results show that the cost of avoided CO₂ from planting trees/increasing albedo is about 0.3-1.3¢/lb. of carbon; for buying efficient electric appliances, 2.5¢/lb. of carbon; and for efficient cars, 10¢/lb. of carbon.

KEYWORDS: Air Conditioning, Cooling, Energy Conservation, Environment, Global CO₂ Control, Heat islands, Modeling, Peak Power Demand, Commercial, Residential, Shading, Albedo, Policy, Vegetation, Evapotranspiration

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INTRODUCTION

Long before mechanical air conditioning, people cooled their homes in the summer by surrounding them with trees and painting the walls and roofs white. The lack of such practices in many urban areas contributes to summer "heat islands" with a typical daily average intensity of 3-5 °C. Several studies have suggested developing guidelines to mitigate this negative effect, on both micro- and meso-scales (Landsberg, 1978; Thurow, 1983).

In this paper, we discuss the use of urban trees and light-colored surfaces as cheap, city-wide energy conservation strategies. Trees improve the urban climate and, by shading, evapotranspiration, and wind shielding, reduce summer cooling energy use in buildings at only about 1% of the cost of the avoided power plants and air-conditioning equipment. Using light-colored paints and surfacing the asphalt of streets and parking lots with light-color sand are equally effective means to reduce summer air conditioning electricity use.

In addition to saving energy, urban trees and light-colored surfaces are probably the most effective ways to decrease the growth of atmospheric CO₂. By reducing the need to burn fossil fuels for generating electricity, urban trees are indirectly many times more efficient at sequestering CO₂ than is rural forestation.

World energy use is the main contributor to atmospheric CO₂. In 1987, the people of the world burned some 300 quadrillion Btus ('quads') of fuel, releasing 5.4 billion tons of carbon into the atmosphere, 2 to 5 times the amount contributed by deforestation (Brown et al., 1988). Increasing use of fossil fuel and deforestation together have raised atmospheric CO₂ concentration some 24% over the last 150 years. According to models of global climate and preliminary measurements, these changes in the composition of the atmosphere have already begun raising the earth's average temperature. If current energy trends continue, these changes could drastically alter the earth's temperature, with unknown but potentially catastrophic physical and political consequences. Since the first OPEC embargo in 1973 and the oil price shocks in 1979, increased energy awareness have led to conservation efforts and leveling of energy consumption in the industrialized countries. U.S. energy use remained at 74 quads/year from 1973 to 1986, although it grew by 1.7 quads in 1987 (Rosenfeld, 1987). An important byproduct of this reduced energy use is a lowering of CO₂ emissions.

Although we are not yet to the point of offering specific guidelines, our preliminary calculations indicate that heat island mitigation strategies such as urban trees and light-colored surfaces are attractive conservation measures that can save 0.5 quad per year with a payback time of 0.3 to 1.8 years, and decrease CO₂ emissions by about 20 million tons of carbon per year.

DIRECT AND INDIRECT EFFECTS OF MODIFYING THE URBAN ENVIRONMENT

The effects of modifying the urban environment, planting trees and increasing albedos, are best quantified in terms of direct and indirect contributions. The direct effect of planting trees around a building or painting its surfaces a light color is to alter the energy balance and cooling requirements of that

particular building. However, when trees are planted and albedos modified throughout an entire city, the energy balance of the whole city is modified, producing city-wide changes in climate. Phenomena associated with the city-wide changes are referred to as indirect effects. The energy use of an individual building is indirectly affected by the changes made throughout the city.

An important reason for making the distinction between direct and indirect effects is that while direct effects are well recognized and can be well accounted for in present models of building energy use, indirect effects have received much less recognition. Methods of accounting for indirect effects have not been as well developed and remain comparatively much less certain. Understanding these effects and incorporating them into accounts of building use is the focus of our current research. It is worth noting that the phenomenon of summer urban heat islands is itself the consequence of inadvertent indirect effects of the built environment. We are proposing using the same principles to create cooler cities.

The issue of direct and indirect effects also enters into our discussions of atmospheric CO₂. Planting trees has a direct effect of reducing atmospheric CO₂ because each individual tree, during its lifetime, directly sequesters carbon from the atmosphere. However, planting trees in cities also has a secondary (indirect) effect on CO₂. By reducing the demand for cooling energy, urban trees indirectly reduce emission of CO₂ from power plants. As we shall discuss, the amount of CO₂ avoided through the secondary effects of trees is considerably greater than the amount sequestered directly.

URBAN TREES AS AN ENERGY CONSERVATION STRATEGY

In addition to their aesthetic value, urban trees can modify the climate of a city and reduce building cooling energy use. Individually, urban trees act as shading and wind-shielding elements modifying the conditions around an adjacent building. Significant increases in the number of urban trees can alter the heat balance of the entire city, moderating the intensity of the urban heat island.

Case studies (Laechelt and Williams, 1976; Buffington, 1979) have documented dramatic differences in cooling energy use between houses on landscaped and unlandscaped sites. In particular, researchers at Florida International University (Parker, 1981) measured cooling savings resulting from well planned landscaping and found that properly located trees and shrubs reduced daily air conditioning electricity use by as much as 50%.

Trees affect energy use in buildings through direct processes such as (1) reducing solar heat gain through windows, walls, and roofs by shading, (2) reducing the radiant heat gain from surroundings by shading, and (3) reducing infiltration by protecting a particular building. When properly placed around a building, trees can prevent unwanted solar radiation from striking the building and reduce its cooling energy use. Deciduous trees are particularly beneficial because they allow solar gain in buildings during the winter and block it during the summer. Acting as wind breaks, trees also lower wind speeds, which may reduce or increase a building's cooling energy use depending on outdoor conditions.

The indirect effects include (1) reducing the outside air infiltration rate by increasing the city surface roughness and lowering ambient wind speeds, (2) reducing the heat gain into the buildings by lowering summer ambient temperatures through evapotranspiration (the evaporation of water from vegetation), and (3) in some cases, increasing latent air conditioning load by adding moisture to the air through evapotranspiration. On hot summer days, a tree can act as a natural "evaporative cooler" using up to 100 gallons of water a day and thus lowering the ambient temperature. The effect of evapotranspiration is minimal in winter because of lower ambient temperatures and the absence of leaves on deciduous trees. A significant increase in urban trees, increasing evapotranspiration during the summer, can produce an "oasis effect" and significantly lower urban ambient temperatures. Buildings in cooler environments will consume less cooling power and energy, although, in some cases, the amount of latent cooling, i.e. humidity removal, might be slightly increased.

ALBEDO AS AN ENERGY CONSERVATION STRATEGY

The energy balance of a building or an entire city depends on the net radiation reflected from its surface. To describe this dependence, one uses the property albedo. Whereas the reflectance of a surface depends on the frequency of the radiation incident upon it, albedo refers to the reflectivity of a surface averaged over the entire solar spectrum. An albedo of 1.0 corresponds to a surface that completely reflects, while an albedo of 0.0 refers to one that completely absorbs all incident radiation. The albedo of an individual building can be modified to achieve direct savings: a lighter building reflects more solar radiation and stays cooler. The albedo of an entire city can be modified to achieve indirect savings by changing city-wide temperatures.

In nature, albedos of different surfaces range from extremes of 0.90 (reflective white) to 0.05 (dark black). Most buildings and cities have albedos in the range of 0.20-0.35, although these values can differ depending on characteristics of the surfaces. Traditional cities of white-washed buildings found in hot climates have albedos in the range of 0.30-0.45 (Taha et al., 1988). Reflective roof membranes and the popular "solar control" glazings of commercial buildings both have albedos of up to 0.8. There is a practical constraint in the maximum achievable urban albedo if this strategy is used in conjunction with increased urban vegetation, since a dense urban tree canopy will cover a large amount of the surface area (the albedo of trees is ~0.25). We have estimated an upper limit of 0.40 for the albedo of a highly-vegetated city with light-colored surfaces.

In practice, using albedo as an energy conservation strategy requires a good understanding of the local climate. In a given location, one needs to be concerned with the impact of albedo on both cooling and heating energy use. Although in general, an effective strategy is to increase the albedo in hot climates to decrease cooling loads, and to decrease the albedo in cold climates to reduce heating loads.

ENERGY SAVINGS

In previous papers (Akbari et al., 1986; Huang et al., 1987; Taha et al., 1988), we analyzed the potential energy and power savings resulting from the use of urban trees and albedo. An analysis of savings was made for both direct and indirect contributions for a number of U.S. cities.

Direct effects were modeled using DOE-2.1C, a computer model for building energy analysis. The effect of trees was modeled by increasing building shade and reducing local wind speeds. To simulate a 30% increase in cover, three trees (one south, two west) were added around each house. The effect of varying foliage density of deciduous trees was accounted for. The reduction in wind speed within the canopy was simulated based on tree cover, where we used an empirical formula derived for vegetated suburban houses in Davis, CA (McGinn, 1982). Although in these studies wind was modeled as an indirect effect, the distinction between direct and indirect effects of wind is inexact, and, for convenience, in this paper we have assumed it to be a direct effect only. The direct effect of albedo was modeled by changing the absorptivity of the building shell, thus affecting the external surface temperature and the conductive heat gain.

The ability of DOE-2.1C to accurately model the direct effects of shading, absorptivity, and infiltration is well recognized. We believe the simulations we have done to be accurate representations of effects nation-wide. However, modeling city-wide climate variations due to trees and albedo is less certain. Our quantifications of indirect effect are preliminary and our methods deserve further discussion.

Indirect effects were simulated using models of urban climate which quantified the impact of trees on wind speed, temperature, and humidity (Huang et al., 1987) and the impact of albedo on ambient dry bulb temperature (Taha et al., 1988). The modifications in ambient conditions were input to DOE-2.1C to simulate the modified building energy and power consumption.

To simulate the effects of evapotranspiration, the amount of water released to the atmosphere was first computed based on meteorological conditions and canopy characteristics. The water vapor was then mixed in an atmospheric volume determined by the dimensions of the city and the time-varying mixing

height above it. The depression in dry-bulb temperature and increase in specific humidity were obtained assuming uniform mixing of the water vapor within the volume.

The indirect effects of albedo were simulated with a one-dimensional model of the urban boundary layer, where the energy balance state at the urban surface accounted for representative values of surface albedo. The albedo values used were obtained from spatially averaging the albedos of the major surface components in the urban area. The indirect effect of trees was to reduce the ambient temperature and increase the local humidity. Temperature reduction was beneficial, while the increase in humidity added to the cooling loads of buildings. The combination of these effects was fully accounted for in the building energy analysis. In the warm cities we have selected, the indirect effect of increasing albedo was to reduce the urban ambient temperature, so that the building was actually simulated in a cooler micro-climate.

Since the indirect effects of albedo modifications were simulated one-dimensionally, our calculations implicitly assumed that the increased albedo would affect the urban temperature but not the radiative budget at the building site (Taha et al., 1986). In other words, the geometry of reflection is not accounted for, nor does the reflected radiation have any effect on surrounding windows or surfaces. Although higher albedos could increase the net heat gain through fenestration because of the increase in reflected radiation, this is not accounted for in our model. In the real world, some design considerations would be necessary to avoid this problem. The re-orientation of windows as well as the careful design of shades would be important. Urban trees could be so located as to block the reflected energy from neighboring buildings. If only the roof surfaces of the houses were whitewashed, the problems of glare and increased heat gain through windows would not exist at all. Finally, we should note that the indirect effects of trees (evapotranspiration) and albedo (temperature depression) have so far been simulated independently. There is now no account for feedback effects which could be significant, since trees may decrease the local albedo and the lower temperature (resulting from higher albedos) may in turn decrease evapotranspiration. This combination of these effects will be accounted for in the near future.

Table I gives the incremental savings in cooling energy and peak power resulting from the direct effects of increased urban tree cover and albedo. The results are shown for both the 1973 housing stocks and newer 1980 houses. The 1973 stock is representative of leaky and poorly insulated housing, while the 1980 homes are tight and well insulated. The 'Base' column in each case represents the base case for a building with normal albedo (30%) and no surrounding trees. The 'Trees' column gives the effects of a 30% increase in tree cover (3 trees) and is broken down into effects of increased shading alone, wind reduction alone, and combined wind and shading effects. It can be seen that by reducing heat gain, shading always reduces cooling loads. The effects of wind reduction, on the other hand, can be beneficial or detrimental depending on outdoor conditions. In the 1973 houses, with relatively high infiltration and conductive heat gains, ventilation is useful in removing the built-up indoor heat. Therefore, reducing wind speed would result in increased cooling energy and power. In the better insulated 1980 houses, infiltration is proportionally significant than conduction, therefore reducing wind speed reduces the cooling peak power. But similar to the 1973 stock, reducing wind speed increases the cooling hours. The 'Albedo' column shows the direct effect of increasing the house albedo to 70%. This is the effect of albedo alone, and it is positive in all the cases. Finally, the 'Combined' column gives the effect of combining the higher albedo with a 30% increase in tree cover. All entries other than those in the 'Base' column represent percent savings.

We are uncomfortable with the surprisingly large negative impacts of wind reduction on cooling energy consumption. Reducing wind affects building cooling energy use by 1) increasing the building envelope's surface temperature (hence increasing the conductive gains), 2) reducing infiltration, and 3) changing the ventilation schedules currently used in our simulations. We are investigating the negative contribution of these three factors. At this time, we believe that the ventilation schedules, which are to some degree arbitrary and can be easily modified, has the largest negative impact on the cooling energy consumption. However, for estimating the conservation potential of trees, we have used the current conservative savings as shown in Table I.

Table 1. Direct savings in cooling energy and peak power resulting from planting trees and whitewashing buildings. All columns, except the bases, are in percent ($\Delta\%$) relative to basecases. Symbols "s", "w", and "a" stand for shading, wind, and albedo, respectively. The tree cover was increased by 30% with respect to the base case, whereas albedo was increased from 30% to 70%. Note the large negative impact of wind reduction (column "w") that is mainly the result of our modeling of ventilative cooling. We have kept these conservative estimates for calculating the national savings. For further discussion, see the text.

Location	1873 Houses (leaky and low-insulation)						1980 Houses (tight and high-insulation)					
	Base	s	w	s+w	a	combined s+w+a	Base	s	w	s+w	a	combined s+w+a
		($\Delta\%$)	($\Delta\%$)	($\Delta\%$)	($\Delta\%$)	($\Delta\%$)		($\Delta\%$)	($\Delta\%$)	($\Delta\%$)	($\Delta\%$)	($\Delta\%$)
Chicago IL												
Peak kW	3.60	19.4	-2.5	16.9	5.6	23.6	3.20	21.0	2.8	23.8	5.3	29.1
Annual kWh	2594.0	29.7	-26.8	3.11	14.8	19.9	1888.0	30.9	-22.8	8.1	12.8	21.6
Miami FL												
Peak kW	5.42	7.0	-8.2	-2.2	20.5	25.3	3.29	14.0	3.0	17.0	6.3	23.4
Annual kWh	13623.0	15.8	-19.3	-3.5	18.6	22.5	8730.0	14.8	-5.8	9.2	7.4	16.5
Minneapolis MN												
Peak kW	3.14	23.8	-1.8	22.0	3.5	27.1	2.66	29.1	0.0	29.11	4.1	31.7
Annual kWh	1916.0	27.3	-16.9	8.4	11.3	20.2	1325.0	36.6	-22.1	14.5	11.1	22.6
Phoenix AZ												
Peak kW	7.56	12.6	2.7	15.3	7.8	26.2	6.10	11.4	11.2	22.6	5.8	31.1
Annual kWh	13117.0	15.9	-12.0	3.9	12.9	19.8	7789.0	15.0	-8.9	6.1	8.9	17.3
Pittsburgh PA												
Peak kW	3.50	20.8	-12.2	14.6	13.7	24.9	2.38	27.5	-9.7	17.8	9.3	23.3
Annual kWh	1821.0	34.0	-35.5	-1.5	19.1	23.3	1177.0	33.1	-28.8	4.3	12.0	20.1
Sacramento CA												
Peak kW	5.40	19.7	-10.1	9.6	13.3	25.4	3.85	16.7	0.2	16.9	7.5	26.0
Annual kWh	3767.0	34.6	-36.8	-2.2	22.3	26.3	2372.0	29.3	-21.5	7.8	11.5	23.8
Washington DC												
Peak kW	5.80	17.4	1.7	19.1	10.5	30.3	3.98	19.1	6.0	25.1	6.7	29.4
Annual kWh	4358.0	25.7	-21.8	3.9	16.4	22.7	2790.0	26.6	-15.5	11.1	10.6	20.0
Average												
Peak kW						26.3						28.0
Annual kWh						21.9						18.6

Table II summarizes our earlier work of indirect savings of cooling energy and peak power. These data represent percent savings in addition to savings which result from direct effects. For the cities modeled, the effect of an additional 3 trees results in approximately 30% savings in annual cooling energy and approximately 15-20% annual savings in peak cooling power. The indirect effects of albedo were quantified for Sacramento, CA for only four days in July. During these days, simulations showed that by increasing the albedo of the surroundings from 0.25 to 0.40, the cooling energy was reduced by 45% and peak power by 21%, suggesting that for a residential building the potential savings from albedo and vegetation are roughly equivalent.

Table II. Indirect savings in cooling energy use and peak cooling power for single story prototype houses. Canopy savings are annual figures. Albedo savings are for the period from July 9 to July 12 only. (All entries are indirect effects, additional to direct effects)

Location	Urban canopy density increased by 3 trees/house*	Albedo of house and surrounding increased**
	Percent energy savings	Percent energy savings
Sacramento CA		
Annual kWh	37	45†
Peak kW	23	21
Phoenix AZ		
Annual kWh	27	--
Peak kW	12	--
Lake Charles LA		
Annual kWh	31	--
Peak kW	15	--
Los Angeles CA (LAX)‡		
Annual kWh	~ 0	--
Peak kW	32	--

* Data from Huang et al., 1987. Assumes an increase of 3 trees per house.

** Data estimated from Taha et al., 1988. Assumes an increase from 0.25 to 0.40 in the albedo of the surroundings.

† Canopy savings are annual savings. Albedo savings for the period from July 9 to July 12.

‡ LAX is on the Pacific Ocean.

We have comparatively few simulations of the indirect effects. Since our models of urban climate are still under development, we conservatively interpret these results as maximum effects. When extrapolating to determine national savings (Table III), we typically assume smaller effects.

QUANTIFICATION OF NATIONAL ENERGY SAVINGS

Total Cooling Energy Use in the U.S.

Of the 86 million households in the U.S., 51 million have air conditioners (room and central) which use an average of 2000 kWh per year (EIA, 1984); so total usage is about 100 billion kWh or 1.2 quads of source energy per year. In the U.S. in 1987 commercial buildings used 670 billion kWh of electricity (EIA, 1987), of which, approximately 20% was used for cooling. This corresponds to a total cooling energy use of about 130 billion kWh or 1.5 quads of source energy per year. Together, residential and commercial

cooling uses 2.7 quads of source energy per year, which is worth at least \$23 billion¹.

Direct Savings

We will assume that tree planting and albedo modification can be applied to 50% of the 51 million air conditioned houses. These measures cannot be applied to all houses with air conditioners since tree density may already be high (especially in older cities). Increase in tree cover and/or albedo modification may also not be acceptable by all municipalities, and some areas may not have a significant cooling load. We will also assume that half of the commercial building stock of 4 million buildings is small enough to be directly affected by shading and albedo modification.

Our analysis shows that the direct effect of planting three trees per residential house and changing the building albedo is an average of 20% cooling energy savings (See Table I). Applying this to the 25 million available residential houses (using 75 million total trees) would result in an energy savings of 0.12 quad. The corresponding direct savings due to the planting of 30% tree cover around small commercial buildings is about 8% (Akbari et al., 1987). When this is applied to 50% of the 2 million small commercial buildings (using another 25 million trees) this would save an additional 0.03 quad. Conservatively, a direct savings of 0.15 quad would be achieved if 100 million trees were planted.

Indirect Savings (Heat Island Effects)

Our preliminary results quantifying indirect effects (See Table II) suggest that tree planting and albedo modification save at least 20% of residential cooling energy use (0.23 quad). Because small commercial buildings are less sensitive to outdoor temperature than residential houses we expect only a 12% savings in small commercial cooling energy use (0.09 quad) due to indirect effects. By reducing temperatures throughout the city, these measures also decrease cooling energy use in large commercial buildings by increasing system efficiency and economizer operating hours. We estimate this would save 5% or an additional 0.04 quad. Table III summarizes the estimated savings due to direct and indirect effects on residential and commercial cooling.

CARBON DIOXIDE AND CONSERVATION

In order to estimate the potential carbon dioxide reduction due to conservation we must estimate the amount of carbon produced in the form of CO₂ for each kWh of electricity generated. This varies from 0.5 lb. carbon/kWh for natural gas fired power plants to 1 lb. carbon/kWh for coal fired power plants. Because cooling energy is almost always used during peak demand periods (except in the case of thermal storage) the electric utility must meet this demand using a combination of coal, oil, and gas fired power plants. The fraction of each fuel type used varies greatly depending on the region of the country and the peak system load and can vary from all coal in some parts of the East to all oil and gas in Texas. However, the national average is approximately half coal and half oil and gas (DOE, 1988). This results in an average emission of 0.8 lb. carbon/kWh generated for peak power.

About half of the savings from the combination of the direct and indirect effects shown in Table III would result from the planting of 100 million urban trees. This savings of 0.25 quads (22 billion kWh) corresponds to a savings of 9 million tons of carbon. Since forest trees sequester carbon at the rate of -6.5 tons per hectare (Brown et al., 1988) and there are -1000 trees per hectare, each tree directly sequesters -13 lb. carbon per year. Therefore, 100 million trees will directly sequester 0.65 million tons of carbon, or one fifteenth of that saved through their reduction in cooling energy use. Another way of looking at this is that to directly sequester the amount of carbon saved by the planting of 100 million urban trees would require the planting of 1.5 billion forest trees corresponding to 1.5 million hectares of forest (Total area of Connecticut is about 1.3 million hectares.)

1. Most residential electricity is still sold at an average price of ~7.5 ¢/kWh, but air conditioning power is mainly "on-peak" and the cost of new peak power is closer to 10 ¢/kWh.

Table III. Yearly savings (by 100 million trees) of primary energy used for air conditioning in the U.S. and consequent reductions in released carbon*.

	Residential **			Small Commercial †			Large Commercial ‡			Total	
	Energy (%)	(10 ¹⁵ Btu)	Carbon (M Tons)	Energy (%)	(10 ¹⁵ Btu)	Carbon (M Tons)	Energy (%)	(10 ¹⁵ Btu)	Carbon (M Tons)	Energy (10 ¹⁵ Btu)	Carbon (M Tons)
Direct Savings	10	0.12	4	4	0.03	1	0	0.0	0	0.15	5
Indirect Savings	20	0.23	8	12	0.09	3	5	0.04	1	0.36	12
Total	30	0.35	12	16	0.12	4	5	0.03	1	0.51	18

* Production of carbon (as CO₂) from a peak power plant assumes 11,600 Btu/kWh sold, and -14,500 Btu/lb. of carbon.

** Residential. US annual residential cooling electricity use is -100 BkWh/yr, corresponding to 1.2 quads. We assumed 3 trees (plus light surfaces) for 50% of our 50 million air conditioned homes, so 75 million trees (plus light surfaces).

† Small Commercial. US uses 65 BkWh (= 0.75 quad). We assumed 30% coverage by trees (25 million more trees).

‡ Large Commercial. US uses 65 BkWh (= 0.75 quad). We assumed no additional trees.

THE COST OF CONSERVED ENERGY AND CARBON

Since all energy conservation measures that reduce fossil fuel use also reduce carbon emissions, the savings shown in Table III should be compared to other conservation strategies in terms of economic attractiveness (Table IV). For example, the trend to more efficient electric appliances yields a cost of conserved energy (CCE) of about 2¢ per kWh saved. Using the value of 0.8 lb. of carbon (in the form of CO₂) for each kWh generated calculated in the previous section, we can compute the cost of conserved carbon (CCC) from more efficient electric appliances at 2.5¢/lb. C. Another conservation strategy is improving efficiency in automobiles. The cost of conserved carbon in going from an automobile that gets 26 mpg to one that gets 36 mpg is 10¢/lb. C. Both these measures are effective and proven, but they are much more expensive than urban trees and light-colored cities.

Table IV shows that increased tree planting and white surfaces have an approximate CCE of about 0.2 - 1.0¢/kWh, and an approximate CCC of about 0.3 - 1.3¢/lb. of C. This is as much as ten times cheaper than either of the examples mentioned above. The point of the comparison is not to discredit the other conservation strategies, which are effective and proven, but to suggest that planting urban trees and modifying urban albedos seems attractive, and definitely worth investigating.

Table IV. Cost effectiveness, energy savings, and carbon savings of urban trees/light surfaces, efficient electric appliances, and efficient cars.

Measure	GCE ¹ (¢/kWh)	Payback Time (yr)	CCC ¹ (¢/lb C)	Implemented Fraction ¹ (%)	ΔUEC^1 by 2000	ΔE (Quad/yr)	ΔC (M Tons/yr)	Cost of Program (\$B)
Urban Trees/ Light Surfaces ²	0.2-1.0	0.3-1.8	0.25-1.25	50	24%	0.55	18	0.5-2.5
Efficient Electric Appliances ³	2	3	2.5	100	17%	.6	21	10
Efficient Cars ⁴	50¢/gal	2.5	8.3	100%	38%	2.8	60	50
Coal Power ⁵	8	10	Base Case	—	—	—	—	—
Nuclear Power ⁵	11	?	4	10% of Coal	—	—	60	84

1. a) CCE is Cost of Conserved Energy, CCC is Cost of Conserved Carbon, and UEC is Unit Energy Consumption.
b) Cost of Program is the nation-wide cost for implementing the measure.

2. Urban Trees/Light Surfaces

a) We assumed 100 M trees cost \$5-25 each (including water for 2 years) for a total cost of \$B 0.5-2.5, a real interest rate of 7%, 3 seedlings planted per air conditioned house, and a growth period of 10 years to yield adequate shade.

b) In calculating CCE, we assumed that electricity is produced from coal-fired power plants at 1 kWh = 11,600 Btu = ~ 0.8 lb of carbon.

c) ΔUEC for air conditioning is direct + indirect effects of urban trees/white surfaces for both residential and commercial sectors.

3. Appliances (Source: Geller 1987, based on the 1987 NAECA)

4. Cars (Source: Rom 1987)

a) The CCE for improving the fleet efficiency of cars from 20 to 36 mpg is estimated to be 50¢/gal.

b) The CCC assumes 8 lb of carbon in a gallon of gasoline.

c) Today, at 18.8 mpg, we use 6.83 Mbood of transportation gasoline. The 26 mpg standard will reduce this 0.63 to 4.76 Mbood. Further gain from 26 to 36 mpg will reduce 4.75 to 3.42, saving 1.33 Mbood, corresponding to 2.8 Quads.

e) Program cost is based on 125 million cars and light trucks at an additional cost of \$400 each.

5. Coal Power and Nuclear Power (Source: Delene 1988)

a) This is not the CCE, but is the cost of coal or nuclear power delivered to the customer. The U.S. median cost for a new coal plant is 4.7 ¢/kWh, and the U.S. median cost for a pressurized-water nuclear reactor is 7.7 ¢/kWh (this doesn't include decommissioning costs or the very uncertain physical, environmental, and economic risks). Add 3-4 ¢/kWh to both of the above costs for transmission and distribution.

b) The CCC assumes nuclear replaces a retiring coal plant yielding a difference of 3 ¢/kWh. At 0.8 lb/kWh of carbon from coal, the nuclear option translates to a CCC of 4 ¢/lb C.

c) Assuming nuclear replaces 10% of coal-fired plants as they are retired, translates to about 30 baseload plants (30 GW). The current U.S. median cost for nuclear plants is \$2800/kW in 1988 dollars.

IMPLEMENTATION

Tree Planting

An estimate of the costs for a large-scale urban tree planting program can be derived by examining a recent experience in Los Angeles, CA. A vigorous tree-planting program was undertaken by Los Angeles in 1983 to beautify the city by planting a million trees before the 1984 Olympic games. This effort was spearheaded by the Tree People (Tree People, 1983). A large lumber company supplied 600,000 drought-resistant seedling pines in containers, which were distributed by a fast food chain restaurant, along with postcards to be returned when the seedlings were planted. Schools and neighborhood groups also planted trees, and undertook to water them for the first two years, after which they can survive on their own. Later in the program, distributors gave out more coniferous and deciduous, smog and drought tolerant native tree species.

The weak point of the project was its follow-up. Although more than a million seedlings and trees were distributed or planted, it is not known what fraction survived. The strong point of the project was its low cost. Less than \$1 million was spent, mainly for printing and advertising, which translates to a cost per seedling of only \$1. In this paper, we assume, conservatively, that a seedling or a young tree can be planted and brought to maturity in a city for \$5 to \$25.

There are already millions of urban trees, and there is much literature on urban forestry, e.g. annual Proceedings of the US National Urban Forestry Conferences (American Forestry Association, 1986), publications of the International Society of Arboriculture, and various books (Miller, 1988; Harris, 1983; Johnson et al., 1982; Grey and Deneke, 1978). In addition to the planting costs, there are potential problems associated with increased numbers of urban trees. Akbari et al. (1987) discuss some potential conflicts between a tree campaign and urban infrastructure.

A careful selection of species and the determination of a safe proximity to buildings, power lines, and so forth can largely eliminate many common problems. Attention to soil type when planting trees next to existing structures will help avoid problems associated with the roots causing changes in moisture content of shrinkable clay soils, resulting in foundation movement and possible structural damage to buildings.

In addition to the above concerns, attention must be paid to the costs for planting, watering, and maintaining trees. In arid environments, there may be a direct conflict between planting trees to reduce energy consumption and the lack or cost of water. It may be possible to overcome this conflict to some extent by using drought-tolerant species that are well adapted to the environment. However, trees that evaporate less water will provide less evaporative cooling.

Another issue to be considered is whether it is physically possible or desirable to increase the number of trees in cities to cover an additional 10% to 25% of the urban area. The answer depends on how heavily forested the city is, how dry the climate is, and where in the city the trees are to be planted. We can estimate the feasibility of an urban tree planting program using results from an analysis of the physical characteristics of the city in question.

Albedo Modification

There are a number of ways to modify a city's albedo: when it is time to repaint or reroof or resurface asphalt, lighter colors can be substituted for the existing color of buildings, reflective rooftops can be used, and white sand can be rolled onto the top of asphalt. Since many urban surfaces need to be recoated eventually, the cost of these methods may be less than the cost of planting and maintaining trees and, in contrast to planting new trees, altering the urban albedo starts to pay for itself immediately.

Changing the albedo of a city does not have to create major conflicts. Cities with white-washed buildings have been acceptable to many countries (e.g. Greece, Middle Eastern countries) throughout history. Also, highly reflective glass buildings are commonly regarded as beautiful. Of course building owners and architects like to have choices of colors for their buildings. An essential element in any undertaking to modify the urban albedo should be an ongoing dialogue with the public to obtain their input and cooperation.

Economics of Implementation

The cost of trees/white surfaces is quite small (~\$15-75/home once compared to \$100/year for air conditioning). Nevertheless, there are questions about how to apportion costs. Businesses and city residents both benefit from a more comfortable environment and from lower summer cooling costs. Utilities benefit from reduced peak power demand, which translates into the construction of fewer new power plants. Cities benefit from an improved local climate because environment is an important consideration for people and businesses deciding where to locate.

A practical and no-cost method of increasing the city albedo is to encourage the use of lighter colors at the time of repainting or reroofing buildings, or resurfacing top asphalts. The cost of planting and maintaining trees in large quantities is low. Since many home owners like to plant trees anyway, all that is needed is a little encouragement and some information on what kind of trees and where to plant them for the most energy savings benefits.

CONCLUSION

During 10 years of high oil prices, conservation kept U. S. energy use constant and resulted in a 10-year leveling of national CO₂ production. Now energy consumption is rising again.

To continue what has been proven to be effective, we propose planting trees and using lighter colored surfaces in cities wherever there is a significant demand for air conditioned buildings. These simple measures are based on design principles that were only recently abandoned with the advent of cheap, abundant air conditioning. The ideas are essentially these: plant a couple of trees on the south and one on the west side of the building to provide shade and evaporative cooling; increase the reflectance of the building and its surroundings so that the building will absorb less radiant energy.

The savings in cooling energy that can be achieved via shading and increased surface reflectivity, or albedo modification, are well recognized. Our preliminary studies suggest that such measures, have a direct effect of reducing the need for residential building cooling by as much as 30%.

Because the direct savings from shading and albedo modification are fairly well recognized, the research of the Heat Island Project at LBL has been primarily on the indirect effects of these measures. Indirect effects are changes in the city microclimate that may eliminate current summer urban heat islands. Eliminating summer heat islands not only further increases the amount of energy saved in the residential sector, but by reducing ambient air temperatures, reduces commercial cooling energy requirements as well.

The same measures offer an extremely inexpensive way to reduce carbon emissions. Although all trees directly sequester carbon, planting an urban tree could produce direct saving of power plant emissions that is equivalent to many times the yearly amount of carbon sequestered by a tree in the forest. The indirect savings achieved by reducing summer heat islands more than doubles the savings of the direct effects of these measures.

ACKNOWLEDGEMENT

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Mr. VOLKMER. Thank you very much, Dr. Akbari. Dr. Ek.

STATEMENT OF ALAN R. EK, PROFESSOR AND HEAD, DEPARTMENT OF FOREST RESOURCES, COLLEGE OF NATURAL RESOURCES, UNIVERSITY OF MINNESOTA

Mr. Ek. Thank you, Mr. Chairman, members of the committee. My name is Alan Ek. I am head of the department of forest resources at the University of Minnesota. I wish to thank you for the opportunity to appear before you to testify on the proposed Urban and Community Forestry Act of 1989. I am speaking as an individual, one who has been involved in research and practice on the assessment of the urban forest resource, and also as an administrator of a land-grant university program involved in research and extension that in part deals with urban forestry questions.

My testimony in support of the proposed act includes a description of the situation in my State. I intend that to serve as an example of the import and the potential impact of the proposed law. Minnesota is a typical midwestern State in many respects. Approximately a third of the State is forested and virtually all of its more than 800 municipalities have some type of urban forest or tree resource.

These urban forest resources have posed significant problems for management. They also offer significant opportunities. Addressing these problems and opportunities has been difficult as compared to addressing forest management in general. Some important reasons for that lie with the varied ownership of the urban forest and the many jurisdictions and publics that have an interest in or impact that resource. The various locations, backgrounds, and interests of these organizations and individuals involved with it have made it especially difficult to develop a common understanding of the urban forestry situation and how it might best be dealt with. This legislation is an important vehicle that could address that and lead to very effective action.

The Midwest and Minnesota in particular was very hard hit by Dutch elm disease. We learned a great deal from that experience. However, we face a new threat now with oak wilt. Oak wilt is viewed as controllable given appropriate educational and management efforts and certain direction for research. Again the fragmentation of the jurisdictions involved, the lack of incentives for cooperation and the lack of vehicles to develop technical input has hurt the overall effort. Further, it has been very difficult to develop a comparable assessment of the value and problems associated with urban forest resources statewide. In the case of oak wilt, it is clear that construction damage is a significant factor. Yet we are only beginning to develop educational programs, ordinances and management efforts to deal with the impact of construction activities. We also see that energy conservation for urban heat islands is a significant item in the quality of life in many areas. We have cold winters in Minnesota, but our summers can be very hot.

The urban forest can also play a very significant role in economic development, both in rural areas and in metropolitan zones. Rural economic development is a major interest in the State, yet many communities do not have a urban forest of the aesthetic con-

dition that would be attractive to economic growth. Seldom do we have the critical mass of talent in small communities to develop and maintain consistently strong urban forestry programs. In densely populated urban areas, one of the first steps in combating urban decay would be the beautification of those areas with trees. But as you have heard, those trees are more than aesthetic resources. They can increase property values and provide wildlife habitat, cool the environment, and they can often serve as an important focus for community improvement.

With respect to the major provisions of the proposed legislation, I find the suggestion of a review of urban forestry research as essential. We have major problems in assessing and comparing urban forest resource statistics within States and certainly across States. In fact, the urban forestry assessment situation is not unlike the rural forest assessment situation before Federal efforts began in the 1920's. However, as we assess those resources, I am sure that priorities for research and action will differ substantially by region and by subregion. Importantly, the bill's suggestion of expanding education and technical assistance is addressed well. When adequately funded our State forestry organizations have been very effective in technical assistance. In Minnesota, our State forestry agency, however, can only offer minimal technical assistance to communities. There simply is a lack of funds. On the other hand, I would urge a strong role for the Cooperative Extension Service of the USDA to act through the State Extension Services. That would be a very effective route for both public education and continuing education of urban forestry professionals. Using the Extension Service would be cost effective and have a major effect upon programs. I would point out, for example, that the allocation of a small portion of the bill's authorization through the Extension Service could provide for an urban forestry professional in almost every State. That would be a major step, perhaps the biggest that I can think of, to galvanize an effective urban forestry effort within States and across States. I say that because a number of States are involved in urban forestry research in at least some small way, and other research they conduct is, in part, applicable to urban forestry problems. That research is conducted through State experiment stations at land-grant universities operating through the Cooperative State Research Service of the USDA. An Extension urban forestry specialist colocated with an experiment station would be able to draw from a well-established research base and could transfer information via the tremendous educational framework already in place within the Extension Service. For most States, that move would be a many-fold increase in the efforts in this area.

The above mentioned State experiment stations would also be cost effective vehicles for research. Funding for urban forestry positions might be developed with a combination of extension and research funding that has worked so well in many areas of research and extension that operate through those institutions.

The suggested competitive grants program would be very effective in galvanizing State and community action to improve community forests. In many cases, it would stimulate involvement in planning by urban forestry professionals, and it would provide an im-

portant degree of continuity for those efforts. Continuity has been a real problem for us.

The bill's suggestion of an advisory council would likewise be a significant step in promoting organization, comparability of information, and priorities for research, education and action plans. In summary, I encourage the committee to act favorably on this proposal. I see this bill as an important item affecting the quality of life for all of the citizens of this country. Thank you.

[The prepared statement of Mr. Ek appears at the conclusion of the hearing.]

Mr. VOLKMER. Thank you very much, Dr. Ek. Dr. Akbari, I notice that the funding for your study, which I think is very well-done, very worthwhile, comes from the Department of Energy; is that correct?

Mr. AKBARI. Yes and no. Our fundings so far have been very, very limited to exploratory type of analysis. The research that I summarized today have been the results of 4 years of voluntary work in part including myself, Professor Rosenfeld, couple of other staff scientists, plus paid graduate research assistants. We have been able to find out piecemeal funding from University of California, from the State of California, and some internal funding from the Department of Energy and some internal funding from the Lawrence Berkeley Laboratory. All these fundings together over the last 5 years have been about \$150,000.

Mr. VOLKMER. In other words, you have been on a very small budget?

Mr. AKBARI. Yes. However, we have an initiative which is introduced by the Department of Energy for fiscal year 1991 asking for a 5-year program of \$7.5 million which continues this research. We have developed a work plan covering about 15 research topics including heat island identification, simulation, demonstration, and eventually dispatching of the information to the communities.

Mr. VOLKMER. All right. Dr. Ek or Dr. Kielbaso, either one of you can answer or both of you can, as far as that is concerned, my next question. How many, say, foresters do we presently have that would be adequately trained in urban forestry? In other words, the problems of urban forestry as against working in a national forest and the trees and things like that.

Mr. KIELBASO. Solid numbers?

Mr. VOLKMER. Do you have an estimate? Would we have a sufficient number if we wanted to do like you said, Dr. Ek, one or two for each State?

Mr. Ek. I would guess of the graduates that have been turned out with forestry backgrounds in the last decade, probably 10 percent would be on the high end of those who are really well qualified in the urban forestry area.

Mr. VOLKMER. Dr. Kielbaso, would you like to comment on that?

Mr. KIELBASO. I think I would concur with some kind of a percentage number like that. We would probably have enough to put one or two in each State, but I doubt that we could go much beyond that. We would probably have to be stealing from some cities that have urban foresters in order to put them at the State level. We do not have that many out there although I think there is a great need, and it is a field that forestry students are realizing

is important. And so the numbers are beginning to increase. Right now it might be difficult.

Mr. VOLKMER. Do we have programs at our universities that include the problems of urban forestry?

Mr. EK. Yes, Mr. Chairman, we do in a number of cases. They are small. They are fragmented. Some schools have developed in the last decade urban forestry curriculum, and the students are moving to those, and that is where the 10 percent or so, just a very crude guess, comes from. We have parts of FTEs or faculty positions or scientist positions directed at urban forestry questions, an insect or disease problem, a plant materials problem, or communication efforts related to urban forestry. They usually are very small parts of the person's assignment.

Mr. VOLKMER. OK.

Mr. KIELBASO. Probably in about a dozen States is about the maximum that we would expect to find or a dozen universities, and that is probably high, where we would expect to find anything like the full-blown program.

Mr. VOLKMER. All right.

Mr. KIELBASO. But as Dr. Ek says, we have got little bits and pieces of various people in different departments so we might be able to add them up.

Mr. VOLKMER. Now if we were able, let us say, to fund these programs that are envisioned in this bill adequately in the next year or so, what urban areas would you envision would be, say, the most desirous of trying to accomplish something? Where would we start?

Mr. KIELBASO. Where would we start? Obviously, we would like to start everywhere. Probably the—

Mr. VOLKMER. You are not going to be able to there. We know that.

Mr. KIELBASO. I can appreciate that.

Mr. VOLKMER. So where would you envision—I am not going to hold you to this—but I am just trying to get some idea—where we would envision that we would start this type of program, not just the research into it, but actually working with the people in the urban areas?

Mr. KIELBASO. I would think that probably two places, and I do not know how to separate them precisely. I think that in my work I have found that the cities of middle population, middle to high population, are probably doing the best job. The cities of smallest populations and of largest population are probably the ones that have the most difficulty.

Large populations, you know, New York, Chicago, Detroit, they are struggling. All the small communities, and in the results of my surveys, I would suspect that the smallest communities are the ones that have the least amount of information about their trees. So we would probably try to split it in both of those if we had to. And I will let someone else be Solomon on that.

Mr. VOLKMER. All right. Dr. Ek.

Mr. EK. I would concur with that.

Mr. VOLKMER. All right. In other words, from the very largest to the very smallest with degrees of how much time a person would spend?

Mr. KIELBASO. Yes. And the middle population sizes are probably the ones that are probably doing the best job right now and that we could, if we needed to, they could be put off for a little longer until the rest of the money became available.

Mr. VOLKMER. Thank you very much. I have no further questions. The gentleman from the State of Washington?

Mr. MORRISON. I just want to thank the panel. No questions. Very, very important information, Mr. Chairman.

Mr. VOLKMER. The gentleman from Indiana.

Mr. JONTZ. Thank you. I also want to thank all three of the witnesses for excellent statements. Dr. Kielbaso, you include in your recommendations for additions to the legislation the recommendation that we clarify the education link between research and the development of technical assistance, and I appreciate the importance of that, and I am not at all sure that we have in the legislation, and you have stated that the Cooperative Forestry Assistance Act and the Resource Research—what does RREA stand for—at any rate, Renewable Resources Extension Act—all right—I was trying to figure out what the second “R” was—should both be amended to enable the research results to effectively reach the stage of technical assistance.

Do you have any thoughts as to what the amendment should say to make sure that the research results do effectively reach the stage of technical assistance?

Mr. KIELBASO. I am not so familiar with the specific bits of legislation to know where there are rough edges. I would simply suggest that someone look at this so that the two agencies, that the Cooperative Forestry Assistance Act and the RREA, were blended together a little bit better to have them both pull together.

Mr. VOLKMER. Would the gentleman from Indiana yield?

Mr. JONTZ. Certainly.

Mr. VOLKMER. I notice in your statement, but I also notice in the bill that we do amend, the gentleman from Indiana in his bill does amend the Cooperative Forestry Assistance Act requiring further technical assistance, and I would suggest that perhaps we permit Dr. Kielbaso to review the legislation again along with the two acts that you suggest and if you can come up with any suggested language or provisions, you can send them to us. We would like to have those, say, within the next 10 days or so.

Mr. KIELBASO. Be happy to.

Mr. VOLKMER. That may be the best way to handle that.

[The information follows:]

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June 20, 1989

The Honorable Harold Volkmer, Chairman
 Subcommittee on Forests, Family Farms, and Energy
 Committee on Agriculture
 Room 1336 Longworth House Office Building
 U. S. House of Representatives
 Washington, D. C. 20595-6009

Subject: HR 2144 suggested modifications

Dear Representative Volkmer;

I greatly appreciated the opportunity to appear before your committee on behalf of H.R.2144, the Urban and Community Forestry Act of 1989. You requested at that time that I offer suggested language to provide an educational link between research and technical assistance, which I testified would be desirable. It seems most appropriate that the language for education follows research, and precedes technical assistance as a logical flow of information. There are, undoubtedly, other ways to accomplish this, but I offer the following for your consideration:

NEW

SEC 5. EDUCATION AND INFORMATION ACTIVITIES

(a) IN GENERAL. -- Section 3. (a) of the Renewable Resources Extension Act of 1978 (16 U.S.C. 1600 and/or 16 U.S.C.1672) is amended by adding at the end the following:

(9) increase public understanding of the economic, social, environmental, and psychological values of trees and open spaces in urban environments and expand the knowledge of the ecological relationships and benefits of trees and related resources in urban environments.

(10) assist State and local organizations (including community associations and schools) in organizing and conducting urban forestry projects and programs and in securing technical and financial assistance.

Harold Volkmer
June 20, 1989
Page 2

REVISE

SEC. 6. INFORMATION AND TECHNICAL ASSISTANCE ACTIVITIES

change education to information throughout

(2) delete (see (10) above)

(3) change to (2)

(4) change to (3)

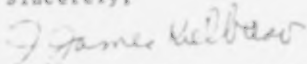
(5) delete (see (9) above)

In furtherance of my suggestion to immediately provide research funds, I offer the following:

SEC. 4 (4) announcement of a program of research grants for expanding the findings associated with (1), (2), and (3) above.

I again wish to compliment the subcommittee and the sponsors of H. R. 2144 for their support of such legislation that will enhance our urban environments. I hope that you find my suggestions useful, and that you will call on me if I may offer further information in your deliberations on this important environmental issue.

Sincerely,



J. James Kielbaso, Ph.D
Professor

cc: Congressman Jentz
Congressman Schutte

Mr. JONTZ. Thank you. Dr. Ek, you do also address that issue in your statement, and if I understand correctly, your recommendation is that through the Cooperative Extension Service, we could put an urban forestry professional in every State and that would be the link between whatever research is going on and the State land grant institution, agriculture experiment station, and the Extension network could then be utilized to transfer the benefits of that research to the communities through the Extension Service. Is that a fair summary of your recommendation for making that link?

Mr. Ek. That is an excellent summary of that, yes. The RREA did a super job in adding forestry expertise to the Extension Service. And this would do, this could do a like job and have a major impact in the Extension Service, yes.

Mr. JONTZ. Do you see any problems with dual system, in essence? We have the State forestry departments and the Cooperative Forestry Assistance Act and we certainly want to utilize the resources of the State forestry departments in working with individual communities.

I know that. And that is what this legislation contemplates. What you are suggesting is that efforts through the Cooperative Extension Service could complement the efforts through the State forestry department. You do not see any problems with duplication there from the standpoint that the need is so vast and the resources are so small that we need to utilize both delivery systems. Would that be your conclusion?

Mr. Ek. That is right, and I might comment that the Extension Service and the State forestry organizations and the U.S. Forest Service through SNPF have a long history of very good cooperation in my region. And, for example, the education efforts, particularly continuing education and general public education, has often been the role through various memorandum of understanding, et cetera, of the Extension Service. The technical assistance has been performed extremely well by the State agencies and U.S. Forest Service.

I would say through past experience with them, I would not see duplication. I would see a need to try to get all these actors in because there are a lot of actors in the urban forestry scene. And I think you would not see duplication. You would see a more effective effort.

Mr. VOLKMER. Would the gentleman from Indiana yield again because there is a point that I have a little confusion in my mind, and I think I need to clear it up myself. Dr. Ek, it was my understanding that when we were talking about—of course, you listen and everybody listens to something and hears something different—when we were talking about an urban forestry maybe in each State, I was assuming, I guess it was, that that urban forester would be with the State forestry department. Now I understand that maybe you are not saying necessarily that. Is that correct or incorrect?

Mr. Ek. My statement referred to putting an urban forestry specialist in the Extension Service of a State who would be colocated with the State Experiment Station research effort. In effect, add them to the Extension component of the universities, forestry research and Extension effort.

Mr. VOLKMER. All right.

Mr. EK. I would not want to preclude other efforts and especially support of the State forestry organizations, but my statement referred primarily to that land-grant institution.

Mr. JONTZ. So the way you would envision that proposal working is that the Extension urban forestry specialist at the Experiment Station would obviously be aware of the research that is going on there, and would be able to work with the Extension agents in the counties, individual counties of the State and that would be the way that the information would flow?

Mr. EK. That would be one way that we have had historically a lot of success with.

[EDITOR'S NOTE.—Dr. Ek's letter of June 20, 1989, follows:]



UNIVERSITY OF MINNESOTA
TWIN CITIES

College of Natural Resources
Department of Forest Resources
110 Green Hall
1530 North Cleveland Avenue
St. Paul, Minnesota 55108
U.S.A.

June 20, 1989

The Honorable Jim Jontz
U.S. House of Representatives
Washington, D.C. 20515

Dear Representative Jontz:

I appreciated the opportunity recently to appear before the House Subcommittee on Forests, Family Farms and Energy to speak in support of the Urban and Community Forestry Act of 1989. This letter is intended to express my appreciation for that opportunity and to followup on one of the questions that arose during testimony.

Concern was expressed by the Committee that we find the right vehicle to support these efforts. If you recall my testimony, I spoke in support of directing at least a portion of this funding to the USDA Cooperative Extension Service. Such funding would then go to fund urban forestry extension specialists on the campus of the state based land grant university institutions where research and extension are based. I indicated the advantage of this in terms of the substantial effect this would have on bolstering urban forestry programs. These extension programs are geared to education and technology transfer. That education is for the public, continuing education for professionals, and a variety of specialized audiences. However, confusion seems to arise in trying to separate "technical assistance" from "education." The mission of the Extension Service is education. In the agricultural scene, the large body nationally of agricultural extension agents operating down to the county level has also been involved in technical assistance, and very effectively so. However, in the forestry arena many state forestry departments have been much better staffed than the corresponding land grant forestry extension efforts. Forestry schools and associated extension efforts rarely support more than two to three extension forestry specialists. These people, in turn, have to operate statewide because there is no real county network of "forestry" agents for direct technical assistance. Consequently, extension units in forestry have concentrated on education and the state forestry departments have concentrated on technical assistance to landowners, etc.

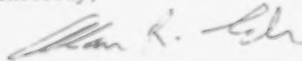
For example, in Minnesota the Division of Forestry of the Minnesota Department of Natural Resources has developed a large group of forestry professionals to deal with cooperative forest management and associated technical assistance programs. The department does a very good job on

The Honorable Jim Jontz
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technical assistance. However, I believe the Extension Service can do a superior job on education and technology transfer. Indeed, with a research and education base at their institutions, they are uniquely qualified for that. The fact that state forestry departments have been, in general, more successful than forestry extension efforts in adding staff is perhaps why some view the best way to augment capability in the urban forestry area is to add more of that capability to the state forestry departments. I think that is true for technical assistance. For education, however, I believe we are best served if that support is directed to the Extension Service.

I hope this clarifies the issue somewhat.

Sincerely,



Alan R. Ek
Professor and Head

ARE/cms

cc: Representative Herold Volkmer, Chairman
Subcommittee on Forests, Family Farms and Energy
U.S. House of Representatives
Washington, D.C. 20515

Mr. JONTZ. Sure, sure, sure. I do appreciate, Dr. Ek, I certainly appreciate what you have to say about the limits on available technical assistance to smaller communities and the inability of the smaller communities. And I want to emphasize when this legislation uses the word "urban," it means not just St. Paul and Minneapolis, but also smaller communities. And I think what you say is true, that many of the smaller communities do not have a critical mass of professional talent, and that certainly whether it was through the Cooperative Extension Service or through the Cooperative Forestry System, the State forester, however we can get that professional talent available to the smaller communities would certainly help.

I know in Indiana, we have foresters who are assigned different regions of the State and have a multitude of responsibilities, and my bet is that they can spend only a very limited amount of their time consulting with the municipalities, the urban interests, but with some additional resource that that certainly would be an effective way of getting the technical assistance to those smaller communities, and that is what this legislation contemplates.

I think my only other question, Mr. Chairman, is for Dr. Akbari. The estimate you gave about saving \$10 billion in electrical bills and \$20 billion in avoided generation air-conditioning investments, is that a 10-year savings?

Mr. AKBARI. We are assuming in that calculation that once the price of energy goes up people would eventually start doing something about it like people would go to more efficient cars. Our research is assuming that we would advance implementation of these measures by 10 years. During that advancement, \$1 billion a year of energy is saved; simple multiplication is \$10 billion during that 10 years. And of course, we would save about 30 big power plants at a cost of about—I do not know—\$1 billion each.

Mr. JONTZ. You said 30 big power plants. 500 MW plants?

Mr. AKBARI. 1 GW.

Mr. JONTZ. OK.

Mr. AKBARI. 20 to 30 GW. At a cost of about \$1 billion each, we estimate savings of \$20 to \$30 billion which I took the conservative estimate of \$20 billion.

Mr. JONTZ. I appreciate your comments about the heat island mitigation manual, and I would think that would be very helpful, and I appreciate also the interest you have in demonstrating the cost effectiveness of shading and we need to think about what can be done to relay the benefits of your research to communities.

I guess what this illustrates is that there is information relating to urban forestry coming from many places. You are not hooked into the Cooperative Extension Service system and what have you the same way that if perhaps the research were being done somewhere else. Nor are you linked into State forestry departments, but we have to find some way of getting information that you are obtaining that would be helpful to cities and make that available to them, and I appreciate your good work and hope that we can find some way through this legislation to do that. And I thank you.

Mr. AKBARI. I would like to make two comments on this particular point that you just mentioned. On the last two recommendations, we have already started to do something. Recently, we had a

heat island workshop in Berkeley which we were planning for 30 people. Something about 100 people attended, and we had to deny admission to another 200 people. One outcome of that workshop was the necessity and the need of such a manual. EPA immediately liked the idea and they have given us a small amount of funding to start the process.

That funding is only about one-tenth of what it takes to have that manual together. EPRI has also started to give us even a smaller amount of dollars to do that. In spite of limited funding the work is definitely going to go on. The preparation of the manual is a cooperative effort between all the experts in the heat island mitigation. The sooner that manual is out the better it is, particularly because some cities have already started announcing a massive urban tree planting program, for instance the city of Los Angeles has announced that they want to plant 1 to 5 million trees as soon as possible. So if they do not have proper and adequate information, there is a danger that the investment might not be paid back with the highest rate of interest.

On the demonstration, also I would like to add that LA department of water and power and the LA unified school district have agreed to cooperate with us to do some kind of demonstration in a couple of the schools in Los Angeles.

The newly established California Institute for Energy Efficiency has tentatively agreed to fund the initial stage of the demonstration.

Mr. JONTZ. I appreciate your comment about the need for getting the best return on the investment, and obviously we need to combine information that you can provide on where to plant trees to get the best return on savings of energy along with information from forestry research projects relating to how to plant trees so that they live longer and survive better, and as you point out, cities are now making a big investment in urban forestry and our concern is that information that will help them to get the greatest return needs to be made available to them, and that is what this legislation contemplates and that is why we talk about getting the Federal Government involved because it is really only the Federal Government, I think, that can coordinate all of that and make sure that information that is happening coming out of Berkeley can be made available to Brookston or whatever other small community one may be concerned. In my particular case, that is home.

So I thank you for your comments and they will be very helpful to us in making some revisions and improvements in the legislation that perhaps will help us save some money for local communities and improve their efforts. I thank the chairman for his patience with my questions.

Mr. VOLKMER. Quite all right. And I want to thank the witnesses for their testimony. I appreciate your taking the time to be here this morning with us, and that will conclude that panel, and now we will go to our next panel.

We have Mr. Allan Mickelson, Illinois State forester and chairman, Urban Forestry Committee, National Association of State Foresters; Mr. R. Neil Sampson, executive vice president, American Forestry Association; and Ms. Madeline Fishel, assistant director of Federal projects, Trust for Public Lands. All your statements will

be made a part of the record. You may either review your statement in full or summarize, however you so desire. We will begin with Mr. Mickelson.

STATEMENT OF ALLAN S. MICKELSON, ILLINOIS STATE FORESTER AND CHAIRMAN, URBAN FORESTRY COMMITTEE, NATIONAL ASSOCIATION OF STATE FORESTERS

Mr. MICKELSON. Thank you, Mr. Chairman. I am Al Mickelson, State forester of State of Illinois, and I have the privilege of chairing the Urban Forestry Committee of the National Association of State Foresters. It is a real pleasure to be here today. I would like to also introduce some of my counterparts that are here, and also great supporters of this legislation, John Mixon, State forester of Georgia; Dick Klason, State forester of Utah; Harold Michael, State forester of Florida; and Jim Roberts, State forester of Maryland.

It is a real pleasure for us to be here and appear before the committee. As has been mentioned in testimony and before, this bill addresses many major concerns that we are very well aware of. And rather than be repetitive of earlier testimony, I shall attempt to abbreviate my remarks. One thing that I did not hear in testimony this morning in great detail, and I think it should be pointed out again or at least reinforced, is that the state or the status of our urban forest is in a definite decline nationwide, and that ranges from the very largest communities we have to the very smallest.

I see a very close parallel to what we are addressing today, paralleling the 1985 farm bill, if you would, inasmuch as we recognized the importance of trees and encouraged land owners to remove their lands from highly erosive row crop production and plant trees.

And so that they had the proper incentives to do that, this committee and Congress saw and expressed great wisdom in providing the necessary incentives, technical assistance, research and other forms of information to achieve the goals of the 1985 farm bill. H.R. 2144 does in fact parallel that and offer the same type of incentives. I think in providing the competitive grants, we are also addressing a very similar need, and that is the economic conditions that many of our city and community governments are facing.

With the limited dollars these municipalities have in their coffers, the shade tree, the park and the boulevard tree is virtually forgotten. Our sewer systems, our water supply, streets and city services use up the existing funds. Trees while an overall part of that community infrastructure and a very important part of it are literally dying while they are waiting for funding. H.R. 2144, the Urban and Community Forestry Assistance Act of 1989 addresses the major concerns of our community and urban forests.

This legislation will definitely improve the management and promote the much needed expansion of trees and forests in our communities. The bill increases the research and educational efforts to improve our understanding of the ecology of trees, the forest and our city environment as well as the economic, social, psychological and environmental benefits of trees where we live. It provides the much needed technical assistance and funds to encourage and sup-

port urban and community forestry benefits. To more than 80 percent of our Nation's citizens that reside in the urban areas, our urban and community forest is a concern of immeasurable importance.

And as I mentioned, this is true in the city of Chicago just as much as it is in the village of Bemidje, Minnesota, or Ballard, Kentucky. Size is not the determining factor here as it relates to the need. Much attention needs to be given to our urban forest and very quickly while our efforts can achieve results effectively and efficiently. I think we have heard those facts and figures mentioned several times this morning.

We have also heard that there is definitely a critical shortage of financial resources, expertise, trained staff, research and applied technologies to manage the urban and community forest so that they can sustain the flow of goods and services and benefits to all of our citizens. H.R. 2144 addresses these shortfalls and sets in motion the forces essential for the betterment of our urban and community forests that is so vital to all of our citizenry.

Mr. Chairman, in the interest of time, allow me to thank you and the committee for the time that has been extended today on this very important piece of legislation. And on behalf of the National Association of State Foresters express our thanks and appreciation for the fine efforts that this committee has extended in the name of forestry. We definitely support H.R. 2144, and respectfully seek your support and passage of that important piece of legislation also. And I thank you very kindly.

[The prepared statement of Mr. Mickelson appears at the conclusion of the hearing.]

Mr. VOLKMER. Thank you very much, Mr. Mickelson. We will now hear from Mr. Sampson.

STATEMENT OF R. NEIL SAMPSON, EXECUTIVE VICE PRESIDENT, AMERICAN FORESTRY ASSOCIATION

Mr. SAMPSON. Thank you, Mr. Chairman. I am Neil Sampson, executive vice president of the American Forestry Association. We want to thank you, Mr. Chairman, and the gentleman from Indiana for all the work that has gone into putting this bill together and for holding this hearing today. We want to commend this bill for your consideration and urge its mark up and passage as rapidly as possible.

You have heard a great deal of information today so in the interest of time, I would like to summarize my statement. What you have heard is that for 10 years there has been a growing interest and a growing capacity in dealing with community forests on the part of the State forestry agencies, the universities, the Extension Services, the research. In the 10 years of operation of these programs, a great deal has been learned, but as you have heard today, a great deal still is not known, and a great deal of work still needs to be done.

You have also heard that the public is really opening up some new concerns. The energy conservation concern that has been discussed by Dr. Akbari is driven even more by the widespread concern about the possibility of global warming. People fear that what

we have already done to our urban areas, reducing the comfort of our communities and increasing our use of energy could be driven even further in the future. This public anxiety, as the gentlelady from Rhode Island told us, creates even more of a public issue right at this point.

This bill before you today does not create new authorities. It takes the framework that has been developed for 10 years and encourages its expansion and acceleration. We support this very, very much because we find that need everyday. We would like to ask the committee to consider some minor adjustments in the bill, to amend the Renewable Resources Extension Act as well as the Cooperative Forest Act. This would make it plain that the Congress wants all elements of the Department to continue to work together in their historic patterns, but to place more emphasis and more resources and more acceleration on urban and community forestry.

As a citizens' organization, we have been encouraging citizens to look about their communities and to find ways for themselves to dig in and help to start to contribute.

We kicked off a program called Global Releaf last fall, and the community and citizen response has been absolutely astonishing. When they respond, we tell them to go to their State forester, to Service forester, to an Extension Office, or to a Soil Conservation office. Those are the people out there who know what to do in that locality.

Well, people have been going, and too many times they are calling on offices that are understaffed, overworked and really feeling the pressure of this new public request for technical and educational assistance.

So from our vantage point, we have seen tremendous public interest, and we have seen a capable Federal, State and local cooperative education and assistance network that is strained to the breaking point trying to respond to the public's needs. We have discovered, in this last year, a tremendous need for Congress to place some acceleration emphasis on these existing programs—not to recreate them, not to change them, but to set them, give them more impetus.

Let us set the dollars in context. You heard this morning that the Federal expenditures on this program are somewhere in the range of \$3 to \$3.5 million a year. We do not know the State expenditures, but we have guessed at about a million dollars a State, including both State forestry work and Extension work. So, about \$50 million a year is the best guess we could come up with.

Locally, research indicates that localities spend about \$2.60 on tree care per capita. That adds up to about \$400 to \$500 million a year coming out of local budgets. We also know, from our work, that we get about \$2 of private and volunteer input for each dollar of local money. So we are talking somewhere in the range of a billion dollars of private input, half a billion dollars of local money, \$50 million of State and \$3 million of Federal for an annual input into these kinds of programs.

And research still shows that the resource is declining and more work is needed. We are not asking the Federal Government to take over that entire task. We are asking you to put an emphasis and increase on that \$3 million a year because we think that is critical

in catalyzing these other inputs. By providing the leadership, and sending the message that this is an important national issue, that the Congress is concerned that the Federal agencies are involved, and that they are encouraging States, localities, and private citizens to contribute. We think that history has demonstrated that those people will, in fact, respond both willingly and with significant resources to leverage any amount of additional Federal emphasis and assistance.

We think we have demonstrated through these witnesses and through these activities around the country, that there is a tremendous public desire for improved community forests and a tremendous opportunity for the Federal Government to draw out significant amounts of benefit and dollars for each dollar it puts in. Thank you, Mr. Chairman. We appreciate your time.

[The prepared statement of Mr. Sampson appears at the conclusion of the hearing.]

Mr. VOLKMER. Thank you, Mr. Sampson. Ms. Fishel.

**STATEMENT OF MADELINE FISHEL, ASSISTANT DIRECTOR,
FEDERAL PROJECTS, TRUST FOR PUBLIC LANDS**

Ms. FISHEL. I am Maddy Fishel, assistant director of Federal activities for the Trust for Public Land. I wish to thank the committee for this opportunity to express our strong support for H.R. 2144, the Urban and Community Forestry Act of 1989. The Trust for Public Land is a private, nonprofit conservation organization. We work nationwide to acquire and preserve open space. Our work ranges in scope from projects to conserve city gardens to rural landscapes to recreation and resource areas in our national forests.

Since our inception 16 years ago, the protection and enhancement of urban open space has been a primary focus of our work. We have been involved in projects in various cities across the country from the Clinton Community Garden in Tudor City Parks in New York City to the Yakima River Greenway in Yakima, Washington, the seaport park in downtown Seattle, Washington, and the 39th Avenue Garden in Oakland, California.

The fundamental aspect of our urban work has been the enormous grassroots constituencies which have come together around efforts to regreen and revitalize their city neighborhoods. Since our projects compromise segments of what has come to be called the urban forest, we have recently initiated an active urban forestry program.

In California in cooperation with nine tree planting organizations across the State, we have launched the California Releaf Campaign. This is a branch of the American Forestry Association's Global Releaf Program, which you have heard about. This enormous grassroots effort has as its goal the planting of 20 million trees in the State's 400-plus urban communities by the year 2000.

This effort which already involves several thousand volunteers will be achieved primarily through the commitment and stewardship of California residents using the models provided by groups such as tree people in LA, San Francisco Friends of the Urban Forest and the Sacramento Tree Foundation.

The origin of the Trust for Public Land's commitment to urban land protection and urban forests is really twofold. First, we recognize the tremendous contribution that city gardens, city parks and urban greenery make to the quality of life everyday. Second, the tremendous public education and awareness value of these green oases cannot in our minds be overstated.

City trees and parks provide the linkage between our huge urban populations and the building of a national environmental constituency for land conservation as well as other pressing environmental issues of our day. More recently other compelling reasons for urban land protection and the greening of our cities has emerged, and many of these have been discussed here today.

City trees, it is recognized, play a significant energy efficiency role in mitigating the heat island syndrome of our cities. Urban greenery plays a role in improving air quality, reducing wind and noise, and mitigating storm water runoff and erosion. Further, it is understood that trees help combat the global warming trend. Citizens need assistance to accomplish the enormous task of filling the available planting spaces throughout our urban areas.

Beyond the act of planting trees, long-term stewardship to manage the additions to the urban forest is critical to its integrity. The establishment of a broadened Federal role in urban forestry as envisioned by H.R. 2144 is greatly needed to enhance existing and to promote new citizen based efforts to revitalize the urban forest landscape of our cities.

Federal assistance to community based organizations such as those involved in California Releaf through matching grants, technical assistance and new research is a wise and cost effective investment. Many of the existing tree planting groups around the country have been started or supported by small grants and technical assistance made available through Federal urban and community forestry funds.

Technical assistance and community forestry education programs made possible by these funds have also been instrumental in improving new development projects that preserve existing vegetation and important open space areas. It is essential that these types of opportunities be expanded and made accessible throughout the country.

The urban forestry movement requires research efforts as well as technical assistance. This is critical to us as a land conservation organization. Often we need to supply current facts and data concerning the potential impact of developing a parcel of open space. Individuals and policy makers must have a clear understanding of the effects of urbanization on vegetation, especially trees. Inventories to determine the condition, number, and characteristics of trees are desperately needed in most cities. Research on problems such as sidewalk damage, low cost pest management and drought tolerant or appropriate species for urban conditions is necessary to improve our management of urban vegetation and open space areas.

In summary, H.R. 2144 will promote a vitally needed public/private partnership in this area of urban forestry. We strongly urge your support for the swift passage of the bill. Thank you.

[The prepared statement of Ms. Fishel appears at the conclusion of the hearing:]

Mr. VOLKMER. Mr. Mickelson, first I assume that every State has a State forester and has a State forestry department or agency in existence.

Mr. MICKELSON. Yes, they do, sir.

Mr. VOLKMER. About how many of those States would have what we call or what we have been here today calling an urban forester that is really cognizant of the problems of urban forestry?

Mr. MICKELSON. Every State forester's office attempts to address all of the concerns of forestry in the State. But urban forestry is one that we have not been able to adequately address in all States. Some States have much more advanced programs than others. Some of the gentlemen who are with me today, Florida and Georgia, have very, very aggressive urban forestry programs with a number of professionals on their staff.

The State of Illinois has a rather modest program with five folks on staff. The thing that I think we need to point out is those States that have very active urban forestry programs are ones who have been able to qualify for the limited Federal dollars available and hire a statewide program coordinator, an urban forester on their staff. That tends to be the catalyst for the balance of the State's local communities and organizations to react to forestry.

I think I can summarize by saying that no matter the number of foresters, urban foresters, we have out there, as Mr. Sampson pointed out, the workload is tremendous and there is no way that we can adequately serve it today.

Mr. VOLKMER. Well, there is no question, I think, in my mind also that the amount of work that needs to be done in comparison with the resources that are going to be available to do it even, in the near future are going to be very limited, and we need to address that which we can do within those means and do the best with what we have. At least that is the way I am addressing this whole issue.

And in light of that, and in fact our previous panel asked the question whether we have sufficient personnel out there that would be qualified as urban foresters to fill the need if we were able to provide any funds to give that incentive to States to improve the thing, the previous witnesses, two witnesses, testified in their opinion there was sufficient personnel. Do you agree with that?

Mr. MICKELSON. I am sorry? That there is not sufficient personnel?

Mr. VOLKMER. There is sufficient personnel.

Mr. MICKELSON. I think there are sufficient numbers of trained folks out there that could do the work. I think where there is a definite lack, however, as has been pointed out, in the technology transfer field, and the limiting factor being funds, be it for technology transfer, technical assistance, and definitely a lack of funds for the competitive grant program.

Mr. VOLKMER. All right. Now that brings me to the next part of my questioning. And that goes to Mr. Sampson, Mr. Mickelson, Ms. Fishel, if you want to join in you can, in what I call the delivery system of how these funds, if we are able to provide the funds, and

how the technical assistance, all that is to be delivered. Is it to be—would you envision, Mr. Sampson, that we would do this not only through the Extension Service but also through the State foresters? We have heard Dr. Ek testify that he would like to see this urban forester within the Extension.

In the first place, we are not going to have enough money to put them in the Extension and to put them in the State forester office both. Let us put it that way.

Mr. SAMPSON. Well, I think very clearly the answer is both, however. There are urban forestry education specialists in the Extension Service today, and there are urban forestry coordinators in the State forestry agencies. Those situations are highly variable between States, as we have heard, and both agencies are very resource limited. What we are suggesting is to provide encouragement for those States who are lacking in either to try to find the resources and to improve their program.

We think additional Federal emphasis can help leverage that. Our organization is not critical of the current delivery system. We think it is quite good. We think it is totally inadequate, and we feel that through the Department's programs you need to provide a little more emphasis. If you do, the response will be different from State to State, because of the talent that is available and the priority needs. We do not think it is useful to try to define that from here so much as it is to encourage it to form up out there in the best and most workable manner.

Mr. VOLKMER. Mr. Mickelson, do you have—

Mr. MICKELSON. Well, I think what I might do is clarify what I see as a bit of confusion here, or maybe I have the wrong impression. But there is definitely a clear delineation of duties and responsibilities between the Cooperative Extension Service and State forestry organizations. And I think we have operated, as Mr. Sampson said, very well within those delineated responsibilities. There is definitely a need for increased Extension activities as it relates to public education and delivery of educational services down to the local landowner or in this case the urban resident.

As it relates to the Cooperative Forestry Assistance Act we are charged with delivering the technical assistance to those landowners, to those communities and administering whatever the competitive grant programs might be within our respective States. So there is very clear delineation of duties and responsibilities. However, there is not enough staff in either one of those two branches to do the work out there, whether it is traditional forestry or urban forestry.

Mr. VOLKMER. Well, I still have not resolved this in my own mind. Maybe I will go one more time at it and then we are going to let it go. Because what I am trying to say in my mind is I have so many dollars here I hope to be able to get, and they are going to be very limited. I am not going to be able to say we are going to put money into the Extension and money into the State forestry in order to provide funds, at least funds for personnel. Let us put it that way.

Now where do I put it?

Mr. SAMPSON. Well, Mr. Chairman, if I might come back and talk about that for just a moment.

Mr. VOLKMER. Where would it do the most good?

Mr. SAMPSON. I believe that differs by State. I think it differs by what is most lacking right now, and those budgets in this Congress, as you well know, come through two different appropriations committees.

Mr. VOLKMER. Oh, yes, right.

Mr. SAMPSON. And they fight for attention within totally different spheres. Within the Extension Service we are trying to give more attention to natural resources out of a highly production agricultural oriented budget. Within the State and Cooperative Forestry agencies we are in a forestry budget.

Mr. VOLKMER. Right.

Mr. SAMPSON. We think that we would like to have this sort of an emphasis here, not to dictate the best place to spend that dollar, but to raise attention to the many national concerns that are coming to bear on urban forests and encourage both of those systems to look within their own priority setting area and try to see if there is not wise ways to spend some more dollars on this effort.

Mr. VOLKMER. Leave both open, in other words, to the States, whichever avenue that they wish to pursue? Would that be your suggestion?

Mr. SAMPSON. That would be our recommendation because as I go from State to State, sir, I just find that they are so different that it hard to say from up here what the best prescription would be.

Mr. VOLKMER. All right. Thank you very much. The gentleman from Washington.

Mr. MORRISON. First of all, appreciation for the Trust for Public Land. They have done some marvelous things in my area, and I am glad to see you here as part of this team. Let me take just a minute, Mr. Sampson, we have worked with you on a variety of things. I am interested in your concept of leverage and might have you expand on that just a little bit for the record. Your feeling is that with the mood of the public with the momentum we have got from global warming and a host of other things that the limited dollars that our Chairman is so concerned about could really be multiplied pretty effectively in this area?

Mr. SAMPSON. We think our estimates of what is going on now indicates that they are very well leveraged, as I tried to indicate. In response to this the Global Releaf Program, people ask that four word question we love to hear: "What can I do?" We are telling people that you can do something positive. You can go outside. You can work with the trees around your home and business. You can join community organizations. And they are doing it. What I am saying is that the public is really concerned about trees and forests, and really wants to do something constructive. We in community organizations certainly try to support those people's efforts. And we think that good public service programs try to support them, too.

We think there is a rapidly growing public demand right now, and that we can harness that public concern. One well-publicized utility bought trees to be planted in Guatemala to offset the carbon dioxide production of a new power plant in Connecticut. Less publicized are utilities all over the country who are turning to their own

communities to support community forestry efforts because it is the best energy conservation strategy they have.

So what I am saying is that we are getting sources of interest and support out of the private sector, and then they go to a State forestry agency like Al Mickelson runs and ask for assistance, and his three or four people are looking at a list of jobs that they cannot possibly cover. And we are finding that all over the country. So yes, I believe that our ability to leverage has been enhanced by this additional public interest.

Mr. MORRISON. Thank you very much. Thank you, Mr. Chairman.

Mr. VOLKMER. The gentleman from Indiana.

Mr. JONTZ. Thank you, Mr. Chairman. I want to state my appreciation also to the members of this panel for your support. I would be remiss if I did not give a special thanks to Neil Sampson and the American Forestry Association for your leadership in drafting of this legislation, and also a special thanks to Mr. Mickelson and the State foresters he represents for your assistance and good work.

Mr. Mickelson, we have had a little bit discussion here about the availability of urban foresters, and I am pleased to hear that State forestry schools are attempting to address the needs in this area, and hopefully there will be more than a dozen schools in the near future that will have more complete program. But would I be correct in assuming that many State forestry departments that when there is money available to hire an urban forester you find a forester that has been doing something else and you make them an urban forester and you hope that they can pick up a little bit of background in that area, on the job training? Am I mistaken about that?

Mr. MICKELSON. Well, in some cases you are correct, where we will take an existing member of our staff and go through some retraining and retooling and updating and move him into the urban forestry field. But in my particular case in the State of Illinois, I do have several graduate foresters that have their educational background specifically in urban forestry, and I am sure that the gentlemen who are with me would tell the same thing in their respective State organizations. Where we have the interest from a young man or a young woman working for us in a regular fields of forestry, we retrain and retool, but where the opportunity presents itself, we hire someone definitely schooled in urban forestry.

Mr. JONTZ. But you can take a forester with a general background and get them some experience and training that will—

Mr. MICKELSON. Right. Yes. Because we find many of the same concerns, and practices in the urban area that we have in the rural area. We are just dealing with, of course, a single tree whereas our rural folks are dealing with sizable forest and the complexities, of course, differ too. But training is available for retooling or for the initial degree.

Mr. JONTZ. My only other question for the panel is really just to ask you to respond to this summary, a generalization if you will, that I would like to make and tell me whether you think this is an accurate depiction of what is happening. One, our urban forests are in decline. The stressful conditions in the city over time have re-

sulted in a loss in urban area and so we really, even though we may take trees in the city for granted, in fact, we are facing a, we are dealing with a downhill trend in the situation in our urban forest. At the same time, we understand more clearly today than what we ever have the need for urban trees because of not only the local environmental benefits but also the global implications.

People at the community level, at the grassroots level, recognize these things and they have responded and there is a real groundswell of interest among residents of our urban areas and this has resulted in a need for technical assistance to make sure that those efforts are as productive as possible, and the agencies that are out there like the State forestry departments, Cooperative Extension Service, what have you, that can give that technical assistance really do not have the horses at the present time to do it. And that that is why we need this legislation. Urban forests are declining. We know that we need to do much more. People at the local level understand that, and the interest is increasing dramatically and efforts are underway, and that makes a critical need for additional technical assistance, additional research, additional demonstration, additional coordination which needs to come in part from the Federal Government. Is that a fair summary of the situation or is there anything you would disagree with in that statement or add to it, any of the three of you?

Mr. MICKELSON. I would definitely support that as a very good summation of the problems that are out there, the concerns, and the needs. I think that is very accurate in how you summed that up, Congressman.

Ms. FISHEL. I would also agree very strongly. All of the land conservation work we do of any type depends on local support, but we ourselves are amazed by the remarkable work force that is out there just ready to go and is really frustrated by not just sometimes a lack of financial support but very much just information to go out and do it.

Mr. SAMPSON. The statement is not only fair, it is excellent. We commend you for that and for your leadership. I think we just want to leave with this impression. If we have, in fact, the public's interest to do constructive things for the environment, both urban and small community and rural, let us not be found guilty at any level of ignoring that or of passing up the opportunity to get them to do it right. There is not just a limited amount of money in this Congress and in these halls, there is a limited amount of money everywhere—private and public.

We need whatever efforts we can to do environmental enhancement in the most positive, cost-effective ways, and the research, technical assistance and education that this bill would encourage to be increased can be vital in making that difference. Thank you, Mr. Congressman.

Mr. JONTZ. Thank you, all.

Mr. VOLKMER. Ms. Fishel, I have one question for you. In your starting paragraph in your statement you mentioned the amount of tree planting that your organization plans to do in California. Where is basically—you do not have to go into specifics—but basically the funding for that coming from? Trees are not all free.

Ms. FISHEL. Right. The funding is coming from a variety of sources. There is some money coming from the State. Much of it is being raised privately in donations from corporations, utilities and in some cases there has been some Federal funds in the way of assistance or start up for demonstration projects.

Mr. VOLKMER. It is a combination there?

Ms. FISHEL. Yes, but everyone's budgets are very tight and there is a great deal more needed.

Mr. VOLKMER. Right. Do you have any idea or generally you are talking about planning to plant 20 million trees in California. Do you have any idea of what that would cost to plant 20 million trees?

Ms. FISHEL. There may be an estimate of that. I do not have it offhand. If there is, I will supply it.

[The information follows:]



15 June 1989

The Honorable Harold L. Volkmer, Chairman
 Subcommittee on Forests, Family Farms and Energy
 Agriculture Committee
 1336 Longworth House Office Building
 Washington, DC 20515

Dear Chairman Volkmer:

At the 7 June 1989 hearing before your Subcommittee on H.R. 2144, the Urban and Community Forestry Act of 1989, you inquired about the funding sources for the California ReLeaf program and the estimated cost to achieve the goal of planting 20 million trees over the next decade. As the following summary indicates, a strong and committed partnership of public and private entities already is investing time, labor, dollars, and heart in California ReLeaf, and H.R. 2144 holds the welcome potential to complete this partnership by establishing an appropriate federal role in urban forestry.

Since the California ReLeaf campaign is a community-based effort, funding is obtained for the groups involved primarily through foundation and corporate grants and private donations. For example, Chevron USA Corporation, Touche-Ross, Bank of America and Chevrolet's GEO have contributed corporate support. Each of the nine tree-planting groups that make up the California ReLeaf network conducts its own fundraising, in its respective region of the state, to help with the purchase of trees, to pay for support staff salaries and to produce local educational and promotional literature.

One source of state funding also has been identified, and other state funds may be on the horizon. A statewide bond issue passed in 1988 (California's Proposition 70) earmarks \$5 million for urban tree planting grants to nonprofit organizations and local government agencies. Pending state legislation includes A.B. 348, the California Reforestation and Urban Forestry Act of 1990 which would provide \$300,000,000 for financing of specified reforestation and urban forestry programs (\$100 million would go to local governmental agencies and nonprofit organizations for urban forestry projects); S.B. 1641 authorizing The California Tree Planting and Urban Forestry Fund, allowing for appropriations up to \$100 million for tree planting, with a focus on urban areas, by the California Conservation Corps. Additionally, a state transportation bill (A.B. 471) would allow up to \$20,000,000 per year of increased gasoline tax revenues to be used for urban forestry programs.

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15 June 1989
Chairman Harold L. Volkmer

The California ReLeaf campaign has identified the following cost estimate to attain our goal of planting 20 million trees throughout the State's 400 plus urban centers by the year 2000:

10 million 15-gallon trees @ \$100 each	\$1,000,000,000
5 million 5-gallon trees @ \$15 each	75,000,000
5 million seedlings @ \$0.50 each	<u>2,500,000</u>
TOTAL\$1,077,500,000	

The total purchase cost of the trees themselves works out to a per capita cost of \$3.80 for the 28 million residents of California, the vast majority of whom live and work in urban areas.

Volunteer labor is handling the tree-planting for the various nonprofit groups in the ReLeaf effort, and it is difficult to quantify the total administrative and other expenses being borne by individuals and nonprofit organizations. It is safe to say, however, that this private investment of energy and funds is central to the program's success and to the substantial goals we have set. By way of contrast, the City of San Francisco estimates that \$650 of city funds are needed for each tree if municipal employees and funding had to do the job alone.

As you can see from all this, there is great potential for substantial funding and support for urban forestry among state and city government and the private sector. H.R. 2144 and the federal support it would provide for these efforts could complete the equation and afford the necessary momentum to turn local and state commitment into living urban forests.

We appreciate your interest in The Trust for Public Land's involvement in urban forestry and open space and commend you for your continuing leadership role on this critical issue. We hope this information is helpful in response to your inquiry and respectfully submit this letter for the hearing record on H.R. 2144. If the Trust for Public Land can provide any further information or assistance we would be most pleased to do so.

Sincerely,

Maddy Fishel

Maddy Fishel
Assistant Director of
Federal Projects

Mr. VOLKMER. I mean actually if you can give us some idea of actually what that is going to cost in amount of dollars, it might give us some idea of what we are talking about on a nationwide project.

Mr. SAMPSON. Community trees are expensive and good community trees are more expensive than little bitty ones.

Mr. VOLKMER. Yes.

Mr. SAMPSON. But in the Los Angeles effort prior to the Olympics, Mr. Chairman, there was so much volunteer work and so much contribution from places that they thought they might have gotten by for an estimate of around a dollar actual cash outlay per tree.

Mr. VOLKMER. That is what I am talking about.

Mr. SAMPSON. But you could not find an estimate of the volunteer and donated assistance in that. The actual street tree in Houston, Texas costs \$100 to the landowner for each tree. If you go into a downtown area, it can be \$200 or \$300 at a planting pit where there is a really difficult problem. We have got that range, but what we have got to do is harness volunteer and community effort so that we get fairly close to that \$1, \$1.50, \$2 cash, and then I think we can see it done.

Mr. VOLKMER. And possibly property owners also.

Mr. SAMPSON. Pardon me?

Mr. VOLKMER. I mean property owners also.

Mr. SAMPSON. That is right.

Mr. VOLKMER. Because it could enhance the value of their property.

Mr. SAMPSON. Exactly.

Mr. VOLKMER. Right. With that, I want to thank this panel also for your testimony today and appreciate your being here this morning.

Our final panel is the Honorable David I. Wynne, mayor of the city of Chesapeake, Chesapeake, Virginia, testifying on behalf of the National League of Cities, Washington, D.C.; Mr. Gregory A. Bowen, deputy director, Calvert County Planning and Zoning Department of Prince Frederick, Maryland, testifying on behalf of American Planning Association; and Mr. Donald C. Willeke, legislative chairman, National Urban Forest Council; and Mr. John M. De Noye, councilman of Herndon, Virginia.

Gentlemen, your statements also will be made a part of the record, and you may either summarize or review your statements in full, and we will begin with Mayor Wynne.

STATEMENT OF DAVID I. WYNNE, MAYOR, CITY OF CHESAPEAKE, CHESAPEAKE, VA, ON BEHALF OF THE NATIONAL LEAGUE OF CITIES AND THE U.S. CONFERENCE OF MAYORS

Mr. WYNNE. Thank you, Mr. Chairman. I have been asked to represent the National League of Cities, also the U.S. Conference of Mayors. As you might suspect, our organizations are in favor of the bill before you. We have perhaps a little different point of view than some that you have heard already this morning. But let me tell you first a little bit about Chesapeake, if you are not familiar with us. We are a city of 150,000 or so in southeastern Virginia. We

are contiguous neighbors of Norfolk, Virginia Beach and Portsmouth.

We are also as is typical in some areas of Virginia a very fast growing community, and we suffer some of the burdens and benefits of that particular phenomenon. Recently Wall Street Journal said that we are one of the eight hottest business development sites in the United States, and we have had several large international companies come to our city in the recent past.

The reason I mention that is because cities of our class which I would say are 100,000 to 500,000 which is most of the cities in the United States, we are suffering from what might be termed the loss of tree material in our cities, and the challenge there is to prevent that continuing loss. In Chesapeake in the last roughly decade from 1976 to 1980 to the current time, we have lost about 15,000 acres in timberland which was about 17 percent.

And I might say as an aside there that one dynamic in this formula which has not been discussed yet is that there is not the something on which there is total agreement in the communities where we are delivering services. There is a consistent contingent between the so-called development community and other interests about how exactly you are going to save trees because developers in the course of their business as a technical matter find it much easier to clear a site and develop whatever is going to go there than they do to work around trees. So that is part of the problem down where the rubber meets the road that is something that could be dealt with in the legislation somehow.

That is less of a problem in rural counties. As a matter of fact, in Virginia, we have been unable to get a tree preservation ordinance through the State legislature because the rural counties perceive tree legislation as a threat to their economic development. They do not want to do or have anything passed that might in any way imply that they are opposed to development, especially in the rural counties where economic growth is slower than it is in some of the more robust suburban communities like Chesapeake.

So there is a dynamic to this that is just not completely all one way. Chesapeake, I am happy to say, is a Tree City, U.S.A. We did pass not long ago one of the first tree preservation ordinances in Virginia although it is one that does not have any sanctions because we are not allowed by our State legislature to impose sanctions. It is a voluntary ordinance.

The fact that trees make a dramatic difference in a community can be seen in a number of ways, and I will just cite just one of them. In our legislation of land use and in rezonings and that type of thing, any of you as you go home to wherever you reside tonight, you can drive through communities where both communities might have small lots, let us say 10,000 square foot lots, in one community, the developer removed the trees. The roads were straight and the houses are all lined up on a bead. In another community, the developer saved the trees, the roads are curved, and the houses use different architectural treatments all on the same lots, and there will be a completely different feeling in those two communities, and that feeling with evidence itself in some very tangible ways.

There will be different crime rates in those two communities. There will be different educational rates in those two communities.

In lots of ways that we can attach hard dollars the treatment of trees eventuates into a much more positive environment. Funds for demonstration projects and for grants are very badly needed in the cities across the country right now, and of course, we very much favor that. I would like to point out that from my point of view the need is greatest in the growing communities, the fast growing communities, many of which are 100,000 to 500,000 because that is where the loss of trees is occurring at the highest rate.

Second to that, or along with that, would be our largest and oldest cities which have been mentioned earlier today where there simply needs to be additional plantings to try to recapture some of the, I guess you could say the ambience that all of us seem to agree is a good thing to have. And thirdly, I would like to say that if we are directing this at localities and we are the people or we represent the people, perhaps both, who will be making application under the program, we would like to have most of the funds, as much of the funds as possible directed to the localities and to not make a stop at the State as the funds pass through us because of the legislative environment that many of the States operate in which I described a few minutes ago. And that is that many, many States the majority of the delegates or State senators represent areas that just do not feel that this is something that is useful in their environment, and they are not likely to let it pass on behalf of those urban communities that do need it.

And finally I would say that I would urge you to limit the number of dollars that you allocate to technical assistance. Most of the cities that I am representing, 100,000 midsize cities and then larger cities, the people who are out there now in our lay perspective having to implement the programs possess sufficient knowledge to tell us what species of trees will survive in an urban environment and which species will not. And they are already telling us that.

Those people are available at the State level now. They are available usually free of charge and with some enthusiasm at local universities and schools and colleges. They are more than happy to assist us with that. We are able to harness the volunteer effort that you have heard described at the local level, and we feel like we can best do that if this grant money gets to us as much as possible so that the bulk of the grant money will eventuate into plant material going in the ground and not another evolution of expertise development on the issue.

Perhaps there is a new body of science on urban trees and I am sure that is true, but at the city where we are going to deliver the programs where we would like to see the trees planted, we would like that to come later, if possible. We will put more plant material in the ground with existing expertise if the grants are designed so that they come mostly to the localities.

The rest of my prepared remarks you have already, and I would be happy to answer any questions. Thank you.

[The prepared statement of Mr. Wynne appears at the conclusion of the hearing.]

Mr. VOLKMER. Thank you very much, Mayor Wynne. I will now hear from Mr. Bowen.

STATEMENT OF GREGORY A. BOWEN, DEPUTY DIRECTOR, DEPARTMENT OF PLANNING AND ZONING, CALVERT COUNTY, MD, ON BEHALF OF THE AMERICAN PLANNING ASSOCIATION

Mr. BOWEN. Thank you, Mr. Chairman, and distinguished members of the Subcommittee on Forests, Family Farms, and Energy. I am Gregory A. Bowen, AICP deputy director of the department of planning and zoning, Calvert County, Maryland. My work experience is with the development of properties, and this is the point where critical decisions are made concerning trees. I am pleased to testify on behalf of the American Planning Association on this important piece of forestry legislation. I respectfully request the complete text of my statement be included in the hearing record. However, I want to deviate from the written testimony to focus on the bill and its relationship to planning and the planning profession.

The American Planning Association is a national organization of over 23,000 city, regional and State planners as well as elected and appointed officials, educators and interested citizens. There is evidence, and you have heard it today that in urban areas the trees are suffering. From the planning standpoint, one problem is that the expertise to install, maintain and protect the trees has not reached a satisfactory level in most areas. Another problem is that enough space is not set aside for trees during the planning and development of urban areas.

You have heard mostly testimony on urban areas and not as much on urbanizing areas. My expertise is with managing development in the suburban fringe. While these areas still have an abundance of trees, the impact of development on the forests is significant and disturbing. Consider, for example, in Anne Arundel County, which includes the capital city of Annapolis, Maryland, which lost 65,000 acres of trees between 1959 and 1985. Similarly, Fairfax County lost 80,000 acres of trees over that same period.

Acreage taken out of forestry production, however, is much greater. In large lot subdivisions of 1 to 5 acres, the forest land often remains, but is no longer held in large enough tracts to be commercially viable for forestry timber production. And then not only is the land taken out of production, but the physical development of the properties has adverse effect on the remaining trees, water quality and animal habitats.

In Calvert County, located in southern Maryland, we have experienced rapid growth over 20 years. And over that time we have seen at least 20,000 acres of forest land and farm land converted to subdivisions. Over the past 13 years, we have benefited from two special pilot forestry programs. Through these programs foresters have been able to perform site evaluations and recommendations prior to subdivision approvals. The foresters have provided our staff with recommendations concerning significant trees and tree stands that should be protected and others that should be removed because they were not compatible with residential development.

This is one part of the development aspect that I was not familiar with before working with foresters and that is that some trees really should not stay on site during the development process if other trees are removed. In Calvert County, we are fortunate to

have citizens and elected officials who support forests and stream protection and innovative land use techniques.

But to implement successful land-use programs that are innovative and pertaining to trees, we need technical expertise. We need research and we need pilot programs. If the bill is adopted, local governments would benefit as follows. Number one, we would have an increase in technical assistance to help local governments and communities in conducting tree or forest inventories.

Second, the increased technical assistance would enable more local governments to improve methods to develop the land. And third, the research and education programs would allow local governments in urban and rural suburban areas to establish tree maintenance and protection programs and regulations. The APA supports the use of tree protection ordinances such as those in Cincinnati, Ohio and Alexandria, Virginia.

The APA recommends that the legislation be clarified to ensure that the State and local management plans for trees and associated resources that are called for in the bill are consistent with State and locally adopted comprehensive plans.

We also recommend that the National Urban and Community Forestry Advisory Council include a member with background and experience in urban planning and we would be happy to assist in providing names of knowledgeable candidates.

In conclusion, the APA supports adoption of the bill. As a result of the new initiatives, we can expect improved energy efficient and attractive urban environments and more resource efficient and attractive suburban environments. Thank you for the opportunity to comment on this legislation. The APA will be pleased to assist members of the subcommittee in passing and implementing the bill. Thank you.

[The prepared statement of Mr. Bowen appears at the conclusion of the hearing.]

Mr. VOLKMER. Thank you, Mr. Bowen. We will now hear from Mr. Willeke.

STATEMENT OF DONALD C. WILLEKE, LEGISLATIVE CHAIRMAN, NATIONAL URBAN FOREST COUNCIL

Mr. WILLEKE. Chairman Volkmer and Members of Congress, my name is Don Willeke, and I am chair of the legislative committee of the National Urban Forest Council. I am also chairman of the Minnesota State Shade Tree Advisory Committee. Now contrary to what is implied in your agenda, I am not from the District of Columbia. I am not from Washington, but am a Minneapolis lawyer in private practice, and that is how I make my living.

I told Mr. AuCoin when I testified before one of his committees that I planted trees to atone for my sin of becoming a lawyer and he asked me if that was good enough, and I said that no, it was not, but that was as good as I could do.

Mr. VOLKMER. Where is the law practice located?

Mr. WILLEKE. It is in Minneapolis, Mr. Chairman.

Mr. VOLKMER. Fine.

Mr. WILLEKE. Although I did not grow up there. I grew up in H.R. Gross' district, maybe you remember him, and then Charlie Grassley.

Mr. VOLKMER. You are an Iowan then.

Mr. WILLEKE. Yes, I guess you can take the boy out of Iowa, but you cannot take Iowa out of the boy. And I admit to that. I work with the National Urban Forestry Council. It was established in 1981 to coordinate community forestry activities across the nation, and now we have through various means about 20,000 people participating in that effort. We strongly support Representative Jontz' bill. Since the inception of the National Urban Forestry Council, our group has seen urban and community forests not as niceties, but as necessities, and we have always emphasized their primary purpose in increasing the energy efficiency of our communities. It is very heartening now to see Members of Congress and others coming around to that viewpoint.

My special concern today, Mr. Chairman, is the proposed National Urban Forestry Council. Now for 15 years I have headed the—

Mr. VOLKMER. We are probably going to have a vote in about 15 minutes. Maybe not. No, we just went into session.

Mr. WILLEKE. I will make it short. For 15 years I have headed the Minnesota State Shade Tree Advisory Committee. We were helped by Marty Sabo who was then speaker of the Minnesota house who guided, with our assistance, appropriations for approximately \$60 million through the Minnesota Legislature to deal with Dutch elm disease and oak wilt and reforest our cities.

Minneapolis, Marty Sabo's district, is fully forested and fully treed now. The smaller communities of our State and of Iowa where I grew up and of northern Missouri, I will venture to say, are not so blessed. And this is why we need a national effort with national incentives. But in speaking to the question of a proposed council, the key point I want to leave with the members of the committee is that our community forests are everywhere and, as we said in our report to the Minnesota legislature last year, all this is not neat and orderly.

I have seen the chairman and others struggling with ways to try and make this thing neat and orderly. It is not neat and orderly, Mr. Chairman, for one reason: Our community forests are in every governmental jurisdiction, from the grounds of the Capitol just across the street from us to small townships in northeastern Missouri or southeastern Minnesota. And the smallest communities have the biggest problems and the least assistance.

Because all of this is messy and complicated, I would urge upon the members of this committee that we need guidance and coordination which is broadly based. Thus, we need a national council which is broadly based, like my own State Shade Tree Advisory Committee, which contains not only government people from the State Government and the communities, but also citizens, academic leaders, business people and a whole broad range of interest. This committee and this council should report, as is recommended by the bill, to the Secretary of Agriculture and not some specific agency, again because of its broad emphasis.

It should not be dominated by any special interest group. It should be balanced. My criticism of the present bill is that the

make-up of the community forest council favors Federal agencies. I think frankly, Members of Congress, that that is a mistake. If this effort is to be successful, the National Community Forest Council, like our community forests themselves, I believe, is a necessity and not a nicety.

Now that is the end of my testimony and what I am going to say in the next minute has nothing to do with any group I represent. I am saying it because I am one of the few people here who makes their living in the private sector. We keep hearing there is no funding available or there is very limited funding available. Members of Congress—not my elected Representatives, I probably should be down beating Marty Sabo over the head with this argument because I believe he is on Ways and Means—there is money available. There is just a trillion dollars' worth of other things that the Members of this Congress have decided have higher priority than our urban forests.

That is my view and I believe that is a correct statement. There are a trillion dollars' worth of other things that you people have decided have higher priority, and as a citizen, speaking strictly for myself now and as a taxpayer, I respectfully urge Members of Congress to change that listing of priorities ever so slightly. About 20 million dollars' worth is what Representative Jontz recommends, and I would certainly go along with his recommendation. Thank you.

[The prepared statement of Mr. Willeke appears at the conclusion of the hearing.]

Mr. VOLKMER. Thank you. Our final witness, Mr. De Noyer.

**STATEMENT OF JOHN M. De NOYER, MEMBER, TOWN COUNCIL OF
HERNDON, VA, ACCOMPANIED BY JOHN DUDZINSKY, URBAN
FORESTER**

Mr. DE NOYER. Mr. Chairman, members of the subcommittee, my name is John De Noyer, and I am a member of the town council of the town of Herndon, Virginia. Herndon is a town with a population of slightly over 15,000 that is located in the Dulles corridor that is experiencing very rapid growth. Since 1980 over 75 percent of the tree cover has been removed to make room for commercial and residential development.

This rate of forest depletion far exceeds the ability of replacement plantings to provide for environmental benefit, beauty, shade and control storm water runoff. In addition, the street trees in the older part of town are being stressed by increased traffic, soil compaction and root damage from adjacent construction and upgrading of utility systems.

The visible impact of clear-cutting each development parcel made our citizens realize that something had to be done and done now. Their voice was clear in the last town election on May 10, 1988. All three environmentally oriented challengers were elected to the town council. Since the new council took office on July 1, 1988, a number of changes have taken place in both policy and practices concerning tree conservation. First, we passed a resolution that stated the town's new policies concerning tree conservation and

published this policy in a brochure that is given to each applicant for a site plan or rezoning.

Second, we made greater attempts to enforce existing regulations for tree protection. This has not been entirely successful because the staff for site plan review and inspections were not adequately trained in tree conservation and protection measures. Third, we amended the zoning and subdivision ordinances to provide for tree inventories, designation of heritage trees and bonding of trees to be saved.

Fourth, probably most important, we hired an urban forester who started work as a member of the town manager's staff on May 8, 1989. His name is John Dudzinsky. I would like to introduce him to you at this time and ask him to come up here in case there are any questions that you want to ask of an urban forester.

Mr. VOLKMER. For the record, would you spell it for the reporter, please?

Mr. DUDZINSKY. Yes. D-U-D-Z-I-N-S-K-Y.

Mr. VOLKMER. And first name.

Mr. DUDZINSKY. John.

Mr. VOLKMER. John. All right. Proceed.

Mr. DE NOYER. Thank you, Mr. Chairman. Until this year, local governing bodies in the Commonwealth of Virginia could only base tree preservation ordinances on the Erosion and Sediment Control provisions of the Code of Virginia. This made it very difficult for localities to enact ordinances. Two important amendments were approved by the General Assembly on April 5, 1989. These code changes authorized certain localities to adopt tree conservation ordinances and to adopt tree replacement ordinances.

Since the Commonwealth of Virginia is a Dillon Rule State, we can now base local ordinances on the value of trees themselves rather than only on their benefit to control erosion and sedimentation. We welcome the provisions that are proposed in H.R. 2144, the Urban and Community Forestry Act of 1989.

The town of Herndon has started on a course to reverse previous trends and do our best to set an example in good urban forest practices. We know that we cannot solve the national or global problems of deforestation, but we can start at home and hopefully many other local jurisdictions will be encouraged to start similar efforts. Together we can make a difference.

Small municipalities and many larger ones need assistance. The Office of Urban Forestry of the Department of Agriculture, Virginia Department of Forestry and the Fairfax County Arborist Office have provided valuable assistance to the town of Herndon in planning and implementing our present start in tree conservation.

We have a long way to go. We need assistance in many areas such as technical information, research on improved species of trees, tree selection and planting methods in the urban environment and implementing and maintaining an effective tree inventory.

Herndon may be in better shape than many municipalities in the metropolitan area. We at least realize that we have a problem and we are trying to do something about it before the forest is paved over and it is too late to take corrective measures. We will not accomplish much unless other neighboring jurisdictions across the

country join in effective programs for tree conservation. I would like to commend the sponsors of this bill for championing the cause of urban forestry. This is a first step. My experience in the Federal Government has taught me that an authorization does not necessarily lead to implementation.

I am convinced that I reflect the opinions and concerns of a broad spectrum of citizens in areas of rapid development across our nation. We hope that this bill passes. If it does pass, then the next big challenge will be to get the needed funding in the President's budget and to get the budget approved by the Congress. I stand ready to lend any support that may be appropriate to encourage funding for this program and implementation of the stated objectives.

Mr. Chairman, I can empathize with the U.S. Department of Agriculture's witness this morning. First of all, the Bureau of the Budget and then later the Office of Management and Budget has told me many times exactly what to say and what not to say, and I have had to say it. This time I am speaking as a town citizen, and I hope that the money is left in the program in an identified way so that it can be directed to the proper uses. Mr. Chairman, members of the committee, thank you very much for the opportunity to talk to you today.

[The prepared statement of Mr. De Noyer appears at the conclusion of the hearing.]

Mr. VOLKMER. Mr. De Noyer, who is your employer?

Mr. DE NOYER. The U.S. Geological Survey, sir.

Mr. VOLKMER. Fine.

Mr. DE NOYER. But I am appearing today as a town employee.

Mr. VOLKMER. That is fine. I just noted that your observation is so true, hits the nail on the head. That is why I was curious and the words that you are able to say what is right and not necessarily what somebody is telling you to say. You know we have had a history of that recently this year up here, and I appreciate that, and also appreciate your comments as to an authorization bill does not give us one penny, which is very true.

But if we all wait for the administration to propose funds for this program, if we ever pass this bill, I think you had just as well forget it for awhile because we have had problems in even keeping our State forestry program going and it has been the Congress that has kept it going, not the administration. So we have problems, and I appreciate your saying that. I also appreciate what you have done. I am just curious. Under the Commonwealth of Virginia's new laws that you have because we heard from Mayor Wynne as to the problems in the State of Virginia, I think when I reside up here I am out in Arlington. I try to follow a little bit, and I think I understand somewhat the way Virginia works, a little different from what we have done in Missouri.

But can you require now a developer to leave certain trees, or can we still just cut them all down and lay bare the ground before he puts in the pipes and the sewers and the streets and everything else and subdivides?

Mr. DE NOYER. The new legislation allows for the designation of heritage trees which can be defined locally. They must be defined

individually by an arborist and approved by the governing body, be it the town council, the board of supervisors or whoever it is.

Mr. VOLKMER. Is that in generality certain trees or specific trees at specific areas?

Mr. DE NOYER. They have to be identified individually.

Mr. VOLKMER. Each tree?

Mr. DE NOYER. Yes, as heritage trees, and then the heritage tree cannot be removed without proper approval.

Mr. VOLKMER. Right. But you cannot require a developer to leave certain stands of trees on a certain area being subdivided?

Mr. DE NOYER. I can certainly encourage him to and thanks to the help of John on my right, John Dudzinsky, and we have gotten a developer in our town to agree to keep a group of very valuable trees very recently.

Mr. VOLKMER. What about the possibility of requiring a developer to replant trees, at least so many?

Mr. DE NOYER. The second bill that passed does give authorization to require replanting.

Mr. VOLKMER. You will be able to do that?

Mr. DE NOYER. Yes.

Mr. VOLKMER. At least that is a step forward. Mr. Willeke, on the make up of the council, I just reviewed that again after hearing your comments and where you say it is dominated by, you know, Federal agencies I fail to see that. I would like for you if you could to—

Mr. WILLEKE. Well, Mr. Chairman, and members of the committee, it is weighted by the suggested categories rather heavily in favor of, I would say, perhaps I should expand my remarks and say Federal and State agencies.

Mr. VOLKMER. All right. In other words, governmental or quasi-governmental?

Mr. WILLEKE. Right.

Mr. VOLKMER. Like you would count what is in that, the State Forestry, Extension Service and—

Mr. WILLEKE. I think, Mr. Chairman, that they should be represented. They are very important. On my own State Shade Tree Advisory Committee, the State and Extension and University people and the heads of community forestry departments and counties are very, very important, but also important are private sector and citizen groups.

Mr. VOLKMER. I yield to the gentleman from Indiana. I know he is concerned about this also.

Mr. JONTZ. I appreciate the chairman yielding and I certainly appreciate your recommendations, Mr. Willeke, and when I count, I do come up with eight governmental representatives.

Mr. VOLKMER. Right.

Mr. JONTZ. And seven nongovernmental. My understanding is, and we did not get into this discussion with Mr. West this morning, the fact that the Forest Service is of the opinion that they could get by with one representative on the committee and that Extension could get by with one representative and perhaps we could adopt that recommendation and free up two or three additional spots to make sure we get an urban planner and make sure we get representatives of community Shade Tree councils like your affili-

ated with in Minnesota, and I think your recommendation is a good one and believe that we can recast the balance of the committee a little closer to the lines that you have recommended.

Mr. WILLEKE. And Mr. Chairman and members of the committee, if I may, having grown up in a small community and being very concerned with the small communities in my State, I really think there ought to be maybe even specific language in there that one of the people ought to come from a very small community or medium sized or smaller community.

One of the best things we ever did in Minnesota, and this was under Marty Sabo's leadership when he was back there, was provide in our incentive grants to communities that it was weighted in favor of the small communities, that the small communities got a 90 percent grant on the first 100 trees that they planted, and this had, as you have heard today, a very catalytic effect. Then you have got a lot of extra labor. You have got a lot of extra assistance that you would not otherwise have gotten.

Small communities need to buy trees that will not fall over. You cannot plant in communities the kind of trees that the Forest Service can plant out in the forest, you have got to plant, as Mr. Sampson said, these more expensive trees. This is a big item, but if they get help with that, then they really do something, and you see an immense outpouring of pride and community activity. This is one of the things that I am most proud of of our successes in Minnesota, and I would encourage you to stimulate that by having the small communities represented.

Mr. VOLKMER. Mr. Willeke, I am going one step further than the gentleman from the Indiana. I would appreciate it if you would take some time either back in Minneapolis or while you are still here, whatever you desire. We will give you at least 10 days. Do you have a copy of your bill?

Mr. WILLEKE. I do, Mr. Chairman.

Mr. VOLKMER. All right. If you would take that council part and write it like you would like to see it. I would just like to see what you would envision in that council because you have worked with the councils and this type of thing, and so in other words, if you could send it to us, give it to us after you have thought about it a little bit in detail as to who you see and what categories, et cetera, I would like to have that.

Mr. WILLEKE. I would appreciate that opportunity, Mr. Chairman.

[The information follows:]



NATIONAL URBAN FOREST COUNCIL

P.O. Box 2000 • Washington, DC 20013-2000

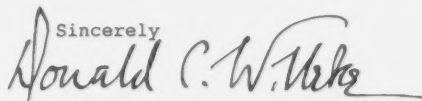
June 16, 1989

The Honorable Harold Volkmer
House Agriculture Committee
Subcommittee on Forests, Family Farms and Energy
US House of Representatives 1336 LHOB
Washington D.C. 20515

Dear Chairman Volkmer,

Thanks for the opportunity to testify in front of your committee on June 7, 1989 concerning H.R. 2144, the Urban and Community Forestry Act of 1989. As you requested, I have enclosed my proposal for revising the make up of the National Urban and Community Forestry Council described in the bill. I feel this proposal offers a better balance of the many persons with interests in the urban forest.

Once again, I want to complement you and the members of your committee on the bill. If I can be of further service please advise.

Sincerely


Donald C. Willeke
Legislative Chairman

Meet Us In St. Louis, October 15-19, 1989, for the Fourth Urban Forestry Conference

June 16, 1989

URBAN AND COMMUNITY FORESTRY ACT OF 1989

Suggestions for:

Sec. 5 (2)(A) The Council shall be composed of 15 members appointed by the Secretary, as follows:

- (i) 2 members from national nonprofit forestry and conservation citizen organization and one member from a professional forestry or arboriculture society.
- (ii) 1 member from State government and 1 member from local governments.
- (iii) 1 member from the forest products industry and 1 member from forestry consultants.
- (iv) 2 members from academic institutions with an expertise in urban forestry activities.
- (v) 1 member from State forestry organization or an equivalent state organization.
- (vi) 1 member from the Extension Service.
- (vii) 1 member from the Forest Service.
- (viii) 2 members who are not officers or employees of any governmental body, one of whom is a resident of a community with a population of 5,000 or less as of the most recent census and both of whom have been active as citizens in urban forestry efforts.
- (ix) 1 member who is not an officer or employee of the United States nor any state government who shall be the chairman of the Council.

A vacancy in the Council shall be filled in the manner in which the original appointment was made.

(g) (2)(B)(i) Except as provided in clauses (ii) and (iii) members shall be appointed for terms of 3 years.

(g) (2)(B)(ii) Of the members first appointed --

- (I) 5, including the chairman, shall be appointed for a term of 3 years;
- (II) 5 shall be appointed for a term of 2 years; and
- (III) 5 shall be appointed for a term of 1 year as designated by Secretary at the time of appointment.

Gov.	Non Gov.	Other
2	3	
1	2	2
1	2	
	1	
5	9	2

Mr. VOLKMER. All right. Thank you very much. Mayor Wynne, some of your frustration that I see that you have is with the Commonwealth of Virginia with the legislative body and the laws as they work. In other words, you do not have the freedom as a city just to do with your municipality as you would like to do; is that correct?

Mr. WYNNE. That is correct. I will just say a brief postscript to that.

Mr. VOLKMER. Yes.

Mr. WYNNE. As my colleague from Herndon said, we do do some other things, and the way we now try to preserve trees is the developer comes along and makes application, and—we say, well, we cannot make you do anything, but by the way what are you going to do with the trees. And then we will let you know whether we are going to approve your application or not.

That is something at least in litigation because we do not have the enabling legislation to really say what he can do.

Mr. VOLKMER. Right. That is what I was wondering. I was wondering how far a municipality could go in refusing to approve a certain subdivision. If you do it arbitrary, I guess they could take you to court and require you to go ahead and approve it. But if you did it on some basis or you are slow in doing it, maybe you could get some of them to at least realize that they need to do something about trees.

Mr. WYNNE. We do that in a whole number of planning considerations. We use the implied threat of denial to get them to volunteer to do things. But other than the limited ways that my colleague pointed out, someone could come in and except with those exceptions they could come in and cut down trees. There is not a lot we could do about it except complain.

Mr. VOLKMER. Well, in observation, like I said, when I am up here I live in Arlington, and I have seen the area in North Arlington around Ballston and that area where a lot of places we have where you have single family residences we have a lot of trees. But as they tear down those single family residences to make office buildings or townhouses there, you no longer have trees, and it is getting to be what I call all concrete, nothing but concrete.

So I see it is not just in the new urbanizing areas, but I also see it in the redevelopment areas also where trees are just completely wiped out. Do you agree with that, Mr. Bowen?

Mr. BOWEN. Yes. I would like to add because there was mention about how far local jurisdiction could go. I am involved in enforcing Maryland's critical areas law. And in those areas of the State of Maryland, we do approve or deny a project based on removal of trees. And as a matter of fact, even if we do allow for tree removal, those trees have to be replanted on site or they have to pay a fee in lieu for the trees to be planted elsewhere in our jurisdiction.

So we have seen about as far as you can go in terms of enforcement and the penalties are pretty stiff if you clear without permits.

Mr. VOLKMER. Just another observation for the two of you that are involved in city government in Virginia, maybe you can start talking to your delegate or your State Senator about. You know, back in Missouri like in my hometown, we have what we call a charter form of government. We can do anything, our mayor and

council can do anything that is not prohibited by the legislature which is a lot different than the way you can do business. And they are a lot freer and available to do about anything. In other words, they basically have self-government. Maybe you can talk to your people about that.

Mr. DE NOYER. Mr. Chairman, we do have that.

Mr. VOLKMER. Home rule, right. That is right. That is something for the future. The gentleman from Washington.

Mr. MORRISON. No questions.

Mr. VOLKMER. The gentleman from Indiana.

Mr. JONTZ. Thank you, Mr. Chairman. I have thanked each of the previous panels for good testimony and their help, but you deserve a different kind of thanks because you are doing exciting things in your home communities, and it is a real encouragement, I think, for all of us here on this subcommittee to learn about the concern at the local level and the interest and to see the exciting things that you are doing. And so I want to express my thanks to you. You are the ones who are really getting the job done at the local level.

Mayor Wynne and Mr. Bowen, and Mr. De Noyer, all of you really have focused on an aspect of the problem that I am not really sure we have dealt with adequately in the legislation which is, number one, adequate attention to the planning process and how we incorporate urban forestry from the beginning.

It is much easier to incorporate the idea that you plant trees early and do it right than it is to come back later on, and I also appreciate what you have to say, Mayor and Councilman, about the conflicts with developers. I suspect that members of this panel, most of us come from districts where development is not so much the problem as is lack of development. And I have a couple communities where development is a problem, but I have got a lot more communities typical of the ones you were speaking of, Mayor, in rural Virginia that are hungry for anything that looks like a bulldozer to bring in new something.

But what you have pointed out is you are really at a critical battleground with thousands of acres at stake and hundreds of thousands and millions of trees. And I guess my question is simply this, if you have any further thoughts about how this legislation could be directed toward the needs that you see in the planning process and in development area to make sure that we address those problems, please let me know.

Mayor, I understand what you are saying about money going directly to communities, and we will have to strike the right balance in that regard. I suppose that we could approach the grants process by saying to communities or to States, well, you have to have certain things on the books in terms of tree protection ordinances, and you have to have done certain things legally in order to qualify for assistance. That is not the approach this legislation takes. I do not think it is probably the tenor of this committee that we want to force that. But there are Federal programs, of course, that make those sort of requirements, and the thought had crossed my mind that we could use the legislation to leverage that sort of action.

But I do not think that they will. I think we are looking for ways to get help out, not looking for ways to prevent communities from

getting assistance. But I am sensitive to the issues that you raise, and if you have further thoughts about how the legislation could be modified to address the problems in the planning process and conflicts over development, I would certainly welcome those and want to thank all of you.

I do just have one question. I want to ask Mr. Dudzinsky about his education and career background. How did you get to Herndon, Virginia?

Mr. DUDZINSKY. I studied conventional forestry, rural forestry, a forest science degree from Penn State, and I just sort of happened into urban forestry when I moved down to Fort Lauderdale and worked for the State of Florida, and they have a very good urban forestry program. From there I really gained most of my experience on the job in the urban forestry field.

So you had made mention that can a rural forester obtain the experience and knowledge in the urban forestry field, and I think I am a good example of that.

Mr. JONTZ. When did you graduate?

Mr. DUDZINSKY. In 1979.

Mr. JONTZ. So you have been in forestry for some period of time.

Mr. DUDZINSKY. Yes, sir.

Mr. JONTZ. And you have been able to focus or specialize now on urban forestry.

Mr. DUDZINSKY. I feel I have found a niche.

Mr. JONTZ. Good. Well, I want to thank the panel again. This has been very helpful testimony. I wish you all the best in your local communities, and I am sure I am going to find some exciting things I do not know about going on in my own State that are similar to what you are doing. I thank you for your good work.

Mr. VOLKMER. The gentleman from California.

Mr. HERGER. No questions.

Mr. VOLKMER. I want to again thank this panel, and Mr. Willeke, we would appreciate your submitting to us the council.

With that, again, all of you have been very helpful like all of our witnesses today, and as we develop this legislation, we will review again your statements, and appreciate your being here today. Thank you very much, and that will conclude the hearing.

[Whereupon, at 12:35 p.m., the subcommittee was adjourned, subject to the call of the Chair.]

[Material submitted for inclusion in the record follows:]

Testimony by
The Honorable Claudine Schneider
before the Committee on Agriculture
Subcommittee on Forests, Family Farms, and Energy
hearing on
Urban and Community Forestry Act, H.R. 2144
June 7, 1988

Mr. Chairman,

I appreciate the opportunity to testify before your Subcommittee on behalf of H.R. 2144, The Urban and Community Forestry Act of 1989. This legislation parallels, and shares the same goals, of the Urban Forestry Conservation Program contained in the Global Warming Prevention Act, H.R. 1078, which I introduced in February and is now cosponsored by 124 members of the House.

There are many excellent reasons for encouraging the reforestation of our communities. According to an analysis by Michigan State University, over a 50-year lifetime a tree will produce over \$30,000 worth of oxygen, provide \$62,000 worth of air pollution control, recycle \$37,000 worth of water, and control \$31,000 worth of soil erosion.

Moreover, on the average, a forest tree absorbs about 13 pounds of carbon dioxide (CO₂) a year. As most American are now aware, CO₂ comprises over half of all greenhouse gas emissions. The U.S. generates about 9 million tons of CO₂ every day.

Clearly the planting of trees can play a key role in absorbing some of these emissions. Indeed, studies by the American Forestry Association and Lawrence Berkeley National Laboratory find tree planting to be one of the lowest cost options available for reducing CO₂ pollutants.

Urban tree planting, in particular, offers outstanding benefits because of its additional value in shading and cooling buildings. This energy-conserving ability enables an urban tree to absorb up to 15 times more CO₂ than a non-urban tree. This is achieved in large part by reducing the air conditioning needs of a building by as much as 50 per cent.

As I am sure you will hear from several experts this morning, the savings nationwide are tremendous. A potential has been identified for planting upwards of 160 million trees in communities across the country. Achieving this level of planting would reduce CO₂ emissions by tens of millions of tons of CO₂ per year and save consumers over a billion dollars per year on their energy bills.

This is an obvious win-win opportunity for the country to take a responsible position on slowing the greenhouse warming, while at the same time enhancing our economic productivity by reducing the energy needed to produce a dollar of GNP.

Unfortunately, only one tree is being replanted for every four that die or are cut down in U.S. communities. In the wake of this urban deforestation, temperatures have been steadily rising. Urban environments are typically 3 to 10 degrees hotter than surrounding countryside. In many cities, like the Washington metropolitan area, temperatures continue to rise by upwards of 1 degree Fahrenheit per decade. This heat island effect not only is uncomfortable, and increases energy bills, but it leads to increased incidences of urban smog.

We can reverse this trend by acting on the legislation before the Subcommittee this morning. The measures in this bill are vital for ensuring that proper and adequate research is carried out on selecting suitable species, that the correct procedures are identified for locating, planting and maintaining trees, undertaking monitoring and evaluation of what works best, etc.

Matching grants are also essential to demonstrate what works, and to spur communities to undertake innovative reforestry programs.

I strongly support this legislation, and encourage the Subcommittee to act on it expeditiously.

STATEMENT OF
ALLAN J. WEST, DEPUTY CHIEF, STATE AND PRIVATE FORESTRY
FOREST SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

Before the
Subcommittee on National Parks and Public Lands
Committee on Interior and Insular Affairs
United States House of Representatives

Concerning H.R. 2144
"Urban and Community Forestry Act of 1989"

June 7, 1989

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

Thank you for this opportunity to offer the Department of Agriculture's views on H.R. 2144, the "Urban and Community Forestry Act of 1989."

The Department of Agriculture would not object to the enactment of H.R. 2144 if it is amended as we suggest.

The Nation's urban forests are contained within the nearly 70 million acres that municipalities occupy. This represents a total area which is over one-third the size of the National Forest System. Trees in urban areas add beauty and diversity to the landscape, improve water and air quality, moderate temperature extremes, reduce noise, control soil erosion, provide wildlife habitat, and improve the overall quality of life in urban areas. It is estimated that urban forests represent an economic value of \$50 billion.

Research related to the role of trees in global climate change continues to document the importance of urban trees in energy conservation and in moderating temperatures. Not only do greenbelts, forested parks and expressway plantings provide these benefits, but also the trees that grace our city streets,

boulevards, and homeowners' yards. The scattered and fragmented nature of the urban forest enhances its contribution to the well-being of people.

In addition to the physical benefits that trees provide, there are important psychological payoffs from urban forests. Trees provide environments that help reduce tension, promote recovery from illness, and improve one's sense of well-being. The personal benefits from planting, caring for, and watching trees grow are important to individuals. Tree-associated events are used as reference points in people's lives. High officials are invited to plant commemorative trees, and homeowners can remember when trees were planted and how big they were in a given year. The urban forest contributes in a major way to the quality of life for the majority of the Nation's population.

Urban and suburban areas are expanding by nearly 1 million acres annually. In the average city, four trees die or are removed for every tree planted. Urban trees and associated vegetation are often abused and overused, and more attention should be given to protection and management of this important resource.

The Forest Service is authorized by the Cooperative Forestry Assistance Act of 1978 (P.L. 95-313) to provide technical and financial assistance to the States for urban forestry programs. The Extension Service is authorized by the Renewable Resources Extension Act of 1978 (P.L. 95-306, as amended) to provide educational programs in support of urban forestry. H.R. 2144 would expand urban forestry authorities, establish a National Urban and Community Forestry Council, permit possible future expansion of education extension assistance and development of a competitive grants program, and provide a stronger basis for cooperation and partnerships among Federal, State, and local governments and private organizations and individuals involved in urban and community forestry.

Forest Service urban forestry efforts began in the mid 1960's, and we provide financial and technical assistance to communities working through the State Foresters. In FY 1988, the Forest Service provided approximately \$1.3 million to the States for urban and community forestry activities. State Foresters used these funds to provide technical assistance involving more than 6,000 projects in communities whose populations totaled over 30 million people. In FY 1989, \$2.5 million was appropriated for the Forest Service urban forestry program. Educational assistance to people and communities on urban forestry is provided through the State Extension organizations within the \$2.7 million appropriated for the Renewable Resources Extension Act in FY 1989.

Through existing authorities, the Department has been successful in encouraging citizens groups, associations and public officials to be our partners in developing new ways to promote the concepts of community tree planting and care. In 1974, the Forest Service, the National Association of State Foresters and the National Arbor Day Foundation established Tree City USA, a community program designed to recognize cities for the long-term commitment to tree planting and care. The first year (1976) of the program produced 47 awardees. In 1988, more than 900 communities qualified for Tree City USA designation.

The Forest Service research program includes about \$860,000 for urban and community forestry research in FY 1989. This research is conducted in Berkeley, California; Chicago, Illinois; and Syracuse, New York. Emphasis has been on development of improved procedures in selecting and growing trees in stressful urban forestry environments, analysis of the characteristics and functions of urban vegetation especially as it relates to modifying temperature and reducing energy, and the management of urban forests and parks for recreational use. These efforts have resulted in five major accomplishments:

1. Development of energy saving techniques for homes through proper tree selection and placement.
2. Identification of the benefits of urban vegetation for reducing water runoff.
3. Development of guidelines for reforestation of urban parks where the forest cover has been depleted.
4. Development of techniques to predict recreationists' perceptions, choices, amount of use, and satisfaction under various design/management options for urban forest recreation areas.
5. Identification of the preferences and recreation activities of recreation areas by Black Americans and other important groups of urban dwellers.

H.R. 2144 would require the Secretary to submit a report to the Congress which would review ongoing research associated with urban forests, make recommendations for new or expanded research, and summarize research priorities. The Forest and Rangeland Renewable Resources Research Act and the Forest and Rangeland Renewable Resources Planning Act provide adequate authority for this purpose. In our judgment, these authorities, combined with the annual budget process, are sufficient to meet the intent of section 4.

Similarly, the Cooperative Forestry Assistance Act of 1978 and the Renewable Resources Extension Act of 1978 already authorize the Secretary to provide technical, financial, and educational assistance for urban forestry programs. We would not object, however, to amending these authorities to include a competitive grants component such as that proposed in H.R. 2144.

In order for the proposed National Urban and Community Advisory Council to function smoothly and with strong support from the general public, we recommend that changes be made in the member composition of the council, the length of time initial members serve on the Council, and the Secretary's role in administering the council.

Subsection 5(a) would authorize \$20 million to be appropriated for each of the fiscal years 1990 through 1999. We recommend this subsection be deleted.

Section 6(c) of the Cooperative Forestry Assistance Act of 1978 already authorizes the appropriation of such funds as may be needed for urban forestry assistance. Since H.R. 2144 would amend the Cooperative Forestry Assistance Act, the funding authorization in subsection 5(a) is not needed. Further, the companion Renewable Resources Extension Act of 1978 already authorizes appropriations for the educational component of urban forestry.

The Forest Service and the Extension Service would like the opportunity to work with the subcommittee on amendments we believe would address these concerns and clarify bill.

We recognize the importance of urban and community forestry. Forestry coordination and research is appropriate to help provide guidance, educational material, experience, encouragement and technical expertise at the local level. Our Nation's urban forests deserve attention in order to protect and manage them for present and future generations. However, Federal financial assistance for urban forestry programs must continue to be considered in light of other budget priorities and the need to reduce the Federal budget deficit. It is appropriate that States, cities, towns, organizations and individuals share a substantial portion of the costs proposed in HR 2144.

Thank you for the opportunity to present our views on H.R. 2144. I will be pleased to respond to your questions.

STATEMENT OF
DR. J. JAMES KIELBASO, PROFESSOR, URBAN FORESTRY
DEPARTMENT OF FORESTRY, MICHIGAN STATE UNIVERSITY
BEFORE THE
SUBCOMMITTEE ON FORESTS, FAMILY FARMS AND ENERGY
OF THE
U.S. HOUSE AGRICULTURE COMMITTEE
JUNE 7, 1989

Mr. Chairman, and Committee Members, I appreciate the opportunity to appear and testify in favor of HR 2144 - The Urban and Community Forestry Act of 1989. I commend the sponsors for their vision of more liveable cities.

As a Professor of Forestry at Michigan State University, specializing in urban forestry, I have had the good fortune to be involved with urban forestry research, teaching, and extension over the past 20 years. I represent only myself and not the university or the several groups which I am, or have been active with, including the International Society of Arboriculture, Society of American Foresters-Urban Forestry Working Group, the Michigan Forestry and Park Association, and the American Forestry Association, although I don't believe that our views differ much. There have been projects dealing with citizen perceptions and preferences in the urban forest, tree values, biological and ecological aspects of the urban forest and urban forest management practices. This personal involvement, along with having had leadership for three national surveys of urban forestry management since 1975 provides me with unique insights of needs as expressed by urban tree managers and others.

First, though, is a brief overview of research and research needs. Surveys of managers of city forests have identified their needs. Research on the current status of urban forest management presents opportunities for improvement. Opportunities are numerous to research tree selection, planting and care. Urban soils and space for trees present a tremendous challenge. Psychological values of trees are not well understood. The potential contributions of trees to the environmental improvement of cities suggests several avenues of research. Unfortunately, funding is not adequate to produce needed information.

From the 1986 survey, when asked on open-ended questions about research needs 120 managers from among 916 questionnaire returns took the time to list problems they are confronted with, and for which they would welcome assistance. These are presented as Appendix Table 1.

Most of these managers' needs center around the theme of survival of trees in cities. The highest number of responses suggested some specific disease problem and the fifth ranking suggested insect problem controls - pest management thus accounted for 29% of suggestions. Needs for improved species selection for difficult urban sites was another 17% and planting, fertilization and watering another 12%. An additional 19% volunteered the problems of ultimate survival associated with tree roots as related to sidewalks and sewers; 77% of

all volunteered responses, therefore, relate to survival. Some writers suggest that the life of an urban tree is as little as 6-8 years, and others more like 30-40 years, but no one dares suggest that urban trees survive as well or as long as their forest counterparts.

The above concurs with a priority ranking of listed needs made by similar respondents in our first national survey in 1974. In that effort, four of the top five priorities related to survivability: 1) Tolerance of various species to adverse conditions; 2) Disease control; 3) Insect control; 4) Employee training; and 5) Species selection.

The values of urban trees by any measurement are much higher as individuals than forest trees. Their ability to ameliorate the urban heat island has been reported as 15 times greater. Trees in cities regularly are valued at \$400-\$1,000 each, much more than the average forest tree, and yet, only about 0.5% of municipal budgets are devoted to urban tree care and much less to researching the problems directly. Only 13 percent of responding cities participate in any research. It has been shown that well cared for street trees increase property values and consequently the tax base. In those cities with at least some identifiable program, the per capita expenditure for tree care is \$2.60, up from \$2.19 five years ago. The per tree expenditure is now \$10.62, down slightly from \$10.78, some five years ago.

Precious little funding is devoted to researching tree selections, planting, growth and survival of the trees that grow in close proximity to nearly 80% of our population. What tree species should be grown? How to protect them from pests? How to help them survive the much more difficult conditions of cities such as heat islands, greatly reduced rooting space, and conflicts with the various infrastructures of our cities? How to successfully grow trees in urban soil, that soil which most of you have probably seen or worked with after development and construction - the soil that usually resembles concrete more than a forest soil? Tree roots growing in this soil are at best poorly understood, and yet this is the support for the above ground tree growth - as the roots grow, so grows the tree. Much more remains to be understood about how trees can adapt and grow in such extreme conditions in order to provide the amenities so badly needed in cities. Space needs to be provided for our urban trees. How much? What is the minimum? More research is needed to answer these.

Nor do we know all that we need regarding the contributions of trees to the urban environment and the welfare of people living there. Research at an early and exciting stage has shown that medical patients recover more quickly and require less pain killing drugs when they are able to view clumps of trees from their window. Much more on this exciting topic remains to be researched and explained.

We need to understand more about the personal, psychological values which people perceive in trees. Studies in inner cities of Baltimore and Philadelphia have demonstrated that when vegetation was established and cared for, the attitudes and morale of residents were uplifted. We need to understand this more fully. The results of the

New York police chief who reduced crime through planting of trees with officers assisting, thereby improving relations between the police and the citizens needs to be explained and repeated. The values of urban trees that residents claim need to be more fully understood. Why do people visit woodlands in and near major cities? There seems to be a strong psychological need and an associated willingness to pay. Why do Chicago residents utilize the Cook County Forest Preserve so heavily, or visit the Morton Arboretum?

Trees offer one of the most cost effective means of ameliorating the heat island effect and contributing to a lessening of the greenhouse gas buildup. Much remains to be researched on the many potential environmental benefits that trees produce, especially in urban areas, as well as in forests, but we also need answers to questions like how much irrigation is required to insure the maximum benefits, and at what cost. Important questions remain as to the benefit of trees to improving air circulation and consequent cooling in urban areas as well as improving urban watersheds. Documentation is needed to verify the value of urban trees in ameliorating flood extremes and thus reduce drainage engineering costs.

How much urban vegetation is needed to lower summer air temperatures? How can trees be used to reduce noise pollution most effectively? We know some things in these regards, but much remains.

In addition to specific research projects to explain details, it would be highly desirable to combine several large, demonstration - research projects to be able to better understand and demonstrate how to manage and protect trees as well as have an ample opportunity to demonstrate the environmental benefits of such programs. A method for predicting various tree failures also needs to be developed to enable managers to eliminate the hazards as early as possible.

Some facts from the 1988 report, "Trends in Urban Forest Management", based on a national survey with 1,062 responding cities may offer some perspective of the needs in urban forestry. Since 1974 the percentage of cities managing these trees on a systematic basis fell from 56% to 39% in 1988. Only 41% are managed on a scheduled basis.

We found that only 27% of cities have a written or formal plan for dealing with trees in an emergency situation such as a tornado or ice storm, etc. Disappointingly, another low 15% acknowledge having an urban forestry management plan of any kind, with but 11% having computerized tree records. Only 38% of urban tree managers know with any degree of certainty how many street trees they have. In fact, estimating the number of street trees is risky. However, in 1988 we estimated that 60 million trees are on streets in the U.S. and another 60 million open spaces remain. Filling these spaces and shading our transportation corridors can reduce heat build up and reduce air conditioning demands.

The estimate of private yard, park and riparian trees would be much less accurate at this time. We need to know the details of this invaluable natural resource near which approximately 75-80% of all U.S. citizens live, have an impact on, and are affected by. We need to know how many trees there are, and information about their species, size and condition, at a minimum.

We continue to find a dangerously low diversity in the trees currently along streets, or being planted. Greater diversity is ecologically important, but research and extension education, as well as technical assistance, are necessary to accomplish this. We need to research and develop more diversity in our urban tree population. Too many cities are today limited to a very few species. We need to find trees that will tolerate urban areas. The research necessary to learn to effectively plant and maintain them is a tremendous need, with the need to disseminate the findings equally important.

Not only the street trees, but all the urban forest needs to be described, and then managed effectively. The information obtained from the "Trends in Urban Forestry Management," International City Management Association, Baseline Data Report, Volume 20, Number 1, helps to describe the management needs and practices relating to publicly owned trees that may be useful as guides. Unfortunately, funding to perform even this basic survey has not been adequate. A total survey is needed to understand the entire urban forest. Not only must it deal with street trees, but also with all of the urban forest. We are presently attempting to sample cities throughout the U.S. to obtain some of the street tree information, but funding continues as a serious problem. I hope to find a way to describe private trees, as well.

I would like to submit some small additions or revisions. First, since the current funding for urban forestry research is so limited, I would petition you to immediately make funds available for the types of research that I have noted above. The several Land Grant Universities and Federal research institutions would offer the ability to produce abundant research results.

Second, in order to provide the education link between research and the delivery of technical assistance, the encouragement of Cooperative Extension Service activities is recommended. Ideally, the Cooperative Forestry Assistance Act (PL 95-313) and the RREA (PL 95-306) should be amended so as to enable the research results to effectively reach the stage of technical assistance.

If we are to improve survivability and management, and the consequent contributions of trees to the quality of the urban environment and to the physical and psychological well being of over 75% of our population living there, more research must be undertaken. Unfortunately, at this time, funding is not generally available for research on urban forest problems in sufficient amounts. The proposed bill, along with modest revisions, provides the opportunity to assist our urban trees.

(Attachment follows:)

Appendix Table 1.
Volunteered Research Needs of 120 Urban Tree Managers

<u>Problem Topic</u>	<u>No. Comments</u>
1. Tree diseases (Includes 12 diverse species/diseases)	30
2. Tree roots, sidewalks, and sewers	26
3. Improved species selections for urban sites	23
4. Planting, watering, fertilizing techniques	17
5. Insect problems (Includes 9 diverse species/insects)	10
6. Inventory systems	6
7. Determining tree values	4
8. Growth regulators	4
9. Effects of air pollution and herbicides	3
10. Salt effects on tree growth	3
11. Uses for disposed trees	2
12. Detection of tree stability	2
13. Pruning techniques	2
14. Pruning equipment	1
15. Vandalism	1
16. High pH and sandy soils	1
17. Native oak management in urban areas	1
18. Spread of disease by chainsaws	1
19. Mycorrhizae on hardwoods	1

From: Bey, C. and J. Kielbaso. 1987. Urban Forestry Research Needs in the United States. Proceedings Society of American Foresters Annual Meeting.

Alan R. Ek
Professor and Head
Department of Forest Resources
College of Natural Resources
University of Minnesota
St. Paul, MN

Mr. Chairman, members of the Committee, my name is Alan Ek. I am head of the Department of Forest Resources at the University of Minnesota. I wish to thank for you for the opportunity to appear before you to testify on the proposed Urban and Community Forestry Act of 1989 (H.R. 2144). This bill focuses on ecological and related values of trees and forests in the urban environment and encourages improved management and the expansion of urban forests. My testimony in support of this proposed act includes a description of the situation in Minnesota. This statement is intended to serve as an example of the import and potential impact of the proposed law.

Minnesota is a typical midwestern state in many respects. Approximately 1/3 of the state is forested and virtually all of its more than 800 municipalities have some type of urban forest or tree resource. These urban forest resources have posed significant problems for management as well as important opportunities. Addressing those problems and opportunities has been difficult as compared to addressing forest management in general. Some important reasons for that lie with the varied ownership of the urban forest and the many jurisdictions and publics that impact or have an interest in that resource. The various locations, backgrounds and interests of these ownerships and organizations has made it especially difficult to develop a common understanding of the urban forestry situation and how it might best be dealt with. The proposed legislation offers an important vehicle to organize effective action.

The midwest and Minnesota, in particular, was hard hit by Dutch elm disease. We have learned much from that experience, however, we face a new threat with oak wilt. The latter is viewed as controllable, given appropriate educational and management efforts. Again the fragmentation of jurisdictions

and lack of incentives for cooperation and technical advice has hurt efforts. Further, it has been very difficult to develop a comparable assessment of the value and problems associated with the urban forest resources statewide. In the case of oak wilt, it is clear that construction damage is a significant factor, yet we are only beginning to develop educational programs, ordinances, and management efforts to deal with the impact of construction activities. We also see that energy conservation for urban heat islands is a significant item in the quality of life in these areas. We may have cold winters, but our summers can be very hot.

The urban forest can also play a very significant role in economic development, both in rural areas and in metropolitan zones. Rural economic development is a major interest in the state, yet many communities do not have an urban forest of the aesthetic condition that would be attractive to economic growth. Seldom do we have the critical mass of professional talent in small communities to develop and maintain consistently strong urban forestry programs. In densely populated urban areas, one of the first steps in combating urban decay can be the beautification of those areas with trees. But trees are more than aesthetic resources, they can increase property values, provide wildlife habitat, cool the environment and often serve as a focus for community improvement.

With respect to the major provisions of the proposed legislation, I find the suggestion of a review of urban forestry research as essential. We have major problems in assessing and comparing urban forest resource statistics within states and certainly across states. In fact, the urban forestry assessment situation is not unlike the rural forest assessment situation before federal efforts began in the 1920's. However, as this effort develops,

I am sure that priorities for research and action will differ substantially by region and sub-region.

The bill's suggestion of expanding education and technical assistance is important. When adequately funded, state forestry organizations have been very effective in technical assistance. In Minnesota our state forestry agency can offer only minimal technical assistance to communities because of the lack of funds. On the other hand, I would urge a strong role for the Cooperative Extension Service of the USDA to act through the State Extension Services. That would be a very effective route for both public education and continuing education of urban forestry professionals. Using the Extension Service would be cost effective and have a major affect upon programs. I would point out, for example, that the allocation of a small portion of the bill's authorization--perhaps \$2-3 million--through the Cooperative Extension Service could provide for an urban forestry professional in almost every state. That would be a major step, perhaps the biggest that I can think of, to galvanize an effective urban forestry effort. I say that because a number of states are involved in urban forestry research or in research that is in part applicable to urban forestry problems. That research is conducted through State Experiment Stations at land grant universities operating through the Cooperative State Research Service of the USDA. An Extension urban forestry specialist, co-located with an experiment station, would be able to draw from a well established research base and could transfer information via the tremendous educational framework already in place within the Extension Service. For most states it would be a many-fold increase in their efforts in this area.

The above mentioned state experiment stations would also be cost

effective for research. Funding for urban forestry research has been limited, but the proximity of state experiment^{s station} scientists to extension resources, their often strong ties to state forestry assistance organizations and the regional nature of many urban forestry problems suggests a potentially very important role for land grant universities. Establishing urban forestry positions or support with a combination of extension and research funding could be particularly effective for both research and education.

The suggested competitive grants program would be very effective in galvanizing state and community action to improve community forests. In many cases it would stimulate involvement in planning by urban forestry professionals and would provide an important degree of continuity. The bill's suggestion of an advisory council would likewise be a significant step in promoting organization, comparability of information, and priorities for research, education and action plans.

In summary, I encourage the committee to act favorably on this proposal. I see this bill as an important item affecting the quality of life for all of the citizens of this country.

STATEMENT BEFORE THE AGRICULTURE COMMITTEE
OF THE HOUSE OF REPRESENTATIVES

BY

ALLAN S. MICKELSON
NATIONAL ASSOCIATION OF STATE FORESTERS
URBAN FORESTRY COMMITTEE

Mr. Chairman, members of the Committee, I am Al Mickelson, State Forester of Illinois and Chair of the National Association of State Foresters' (NASF) Urban Forestry Committee.

The members of the NASF are the directors of the state forestry agencies of each state. The primary responsibility of their agencies is to conduct forestry work for the public good in their respective states. They work cooperatively with private, federal, and other state and local agencies, organizations and individuals in directing and strengthening all forestry programs within their states, including urban forestry.

We welcome this opportunity to appear before you to discuss the importance of HR 2144, the Urban and Community Forestry Act of 1989. The NASF believes that this legislation is addressing a natural resource issue that is of major importance and concern to every citizen and every community in the nation. Trees and forests in our community areas are in a serious decline. Nationwide in our large urban areas and in our rural towns and communities for every tree that is planted four (4) die or are removed. These urban and community forest cover over 70 million acres. That is an area nearly 2 times the size of the State of Illinois. These forested lands have tremendous ecological, social and economic value and contribute enormously to the social well-being of these communities and their residents.

For many years Congress has recognized the importance of our rural forest lands by providing incentive and technical assistance to encourage landowners to plant, manage and protect their commercial forest lands. These programs have reached new importance as a result of the Food and Security Act of 1985, the 1985 Farm Bill. We cannot tolerate the soil erosion rates of the past, nor the clearing of forest lands, the draining of our wetlands or the resulting loss of wildlife habitat and continuing decline of our water quality. However, we did not and should not ask the farmer to foot the bill for these practices.

A similar situation exists with our urban forest, they are being cleared at an alarming rate for new transportation and utility corridors, new housing and industrial developments; they are ravaged by insects and diseases, and over used for recreational pursuits to the point they are being depleted, stressed and of reduced value.

City and community governments much like the farmer are economically strapped. With limited dollars in the municipal coffers the shade tree, the park and boulevard tree is forgotten. Sewers, water supply, streets and city services use up the existing funds. Trees, while a part of the overall community infrastructure, are dying while awaiting funding.

HR 2144, The Urban and Community Forestry Act of 1989 addresses the major concerns of our community and urban forest. This legislation will improve the management and promote the much needed expansion of trees and forests in our communities. The bill increases the research and education efforts to improve our understanding of the ecology of trees and forests in the city environment, as well as the economic, social, psychological and environmental benefits of trees where we live. It provides for the much needed technical assistance and funds to encourage and support urban and community forestry benefits.

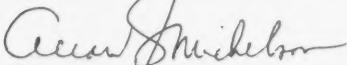
To more than 80% of this nation's citizens that reside in urban areas, the urban and community forest is a concern of immeasurable importance. This is true in our heavily urbanized regions such as New York, Chicago, Atlanta, Los Angeles, and Denver but is of equal importance in Kokomo, Indiana; Lincoln, Illinois; Ashville, North Carolina; Butler, Kansas; Grander, Washington; Bemidje, Minnesota; or Ballard, Kentucky.

Much attention needs to be given our urban forests and quickly, while efforts can achieve results effectively. However, there is a critical shortage of financial resources, expertise and trained staff and research and applied technologies to manage the urban and community forests to sustain the flow of goods, services and benefits to our citizens.

HR 2144 addresses these shortfalls and sets in motion the forces essential to betterment of our urban and community forest and vital to our citizenry.

Mr. Chairman, members of the Committee, I wish to thank you not only for the time extended today, but also to express thanks and appreciation of the National Association of State Foresters for the past efforts of this committee in addressing forestry issues and respectfully seek your support and passage of HR 2144.

Respectfully submitted



Allan S. Mickelson
Chair, Urban Forestry
National Association of State Foresters

ASM:amb



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STATEMENT OF
R. NEIL SAMPSON
EXECUTIVE VICE PRESIDENT
THE AMERICAN FORESTRY ASSOCIATION
TO THE
SUBCOMMITTEE ON FORESTS, FAMILY FARMS, & ENERGY
AGRICULTURE COMMITTEE
U.S. HOUSE OF REPRESENTATIVES
JUNE 7, 1989

Dear Mr. Chairman and Subcommittee members:

I am Neil Sampson, Executive Vice President of the American Forestry Association. The American Forestry Association is the nation's oldest citizen's conservation organization, with a national membership dedicated to the improvement of America's trees and forests.

I commend the sponsors of H.R. 2144, the Urban and Community Forestry Act of 1989. It outlines important actions that must be taken to improve and revitalize the health of an important natural resource, the trees and forests in and around the places we live. You can be assured of the strong support of our organization as the Congress considers this bill.

Community trees and green space are a valuable resource that is being wasted during land conversion from rural to urban, inadequately understood when communities are planned and constructed, and poorly managed and maintained after communities are established. Community forests are a resource in need of a wide range of assistance nationally. This committee is in a unique position to initiate the actions needed to significantly change the condition of this public resource.

Community forests cover a large, and ever increasing area of our country including over 70 million acres of incorporated municipal property, and a large but unknown area of unincorporated community property and suburban development. The publicly owned portion of this resource in established communities is valued at over \$50 billion dollars, and the privately owned and newly developed and unincorporated areas is considered to be at least as large.

The community forest resource provides a valuable natural resource function in our country that needs to be protected and wisely managed. Community trees filter

The National Citizens Organization For Trees, Forests, and Forestry

and remove air pollutants, reduce soil erosion, retard flooding and prevent water pollution, primarily from nonpoint source. From our work on farms, forests, and rural lands, we are well aware of the role of trees and forests in curbing these pollution problems, yet too often we abandon or reduce needed technical services to communities and landowners as land develops. This is a critical period when the forest resource is under stress and its value as a public resource increasing.

Trees improve public health, in addition to pollution reduction. They reduce noise, improve recreation opportunities, and lower human stress levels. They enhance community stability through enhancement of living quality and increased property values. Well-kept community trees are a significant asset in attracting business and jobs to a community.

Urban and community trees play a critical role in moderating temperatures in urban areas. Through their shading and cooling effects, trees can reduce the effects of urban "heat islands" and contribute significantly to energy conservation. Recent research at the Lawrence Berkeley Laboratories indicates that each degree Fahrenheit reduction in peak summer temperatures results in a two percent reduction in electricity consumption in urban areas. It also indicates that the potential savings nationally from planting trees in available and energy-efficient tree spaces is in the range of \$4 billion per year.

Urban trees play a significant role in the reduction of carbon dioxide (CO₂)--the major culprit in global warming--primarily because of this energy-saving effect. Urban and community trees use CO₂ in their growth processes, but more importantly, they reduce the need to burn fossil fuels for energy, and thus reduce CO₂ emissions. Urban trees that effectively cool and shade urban areas are 15 times more important than rural trees in reducing CO₂ build-up because of the energy they save.

National and global problems such as energy consumption, air pollution, and global warming need careful consideration by Congress. Urban trees play an important role in addressing all of these concerns, which is a major reason why H.R. 2144 is timely and worthy of consideration. In addition, there is a direct correlation between the health, vigor, and extent of urban and community trees and the quality of life in our towns and cities. Trees and forests in communities across our nation have been in a serious state of decline over the past ten years. This does not bode well for the social well-being in many towns and cities.

Community forests are in trouble and they need help. Along with the unwise treatment given to forests as land use changes, trees in established communities are declining. In a 1986 sample survey, conducted by the American Forestry Association, we discovered four trees die or are removed for every tree planted. An oak or maple that could live 200 years in the forest lives an average of 32 years in a community and less than 10 years in a downtown city planting pit. Extending the lifespan of these trees

is the quickest way to increase the benefits they produce.

There are thousands of rural communities and small cities across the country that do not have the financial resources or administrative structure to have a trained expert, an urban forester. They have the basic manpower and citizen volunteer support to improve their community forests, but need technical assistance and guidance. The effectiveness of supplying federal technical assistance to communities has been successfully demonstrated by the U.S. Forest Service. Under P.L.95-313, a modest urban forestry effort has been in operation for ten years. This bill would amend that law, broaden its scope, and create a new focus for community forestry activities. I feel this change is timely and important.

I would also like the committee to consider two other adjustments in the bill. First, is to amend RREA as well as the Cooperative Forestry Act so that the Extension Service can provide the educational support needed in conjunction with the expanded technical assistance provided by the U.S. Forest Service. Funding for these programs will then be easily directed by the Secretary of Agriculture. Secondly, a significant improvement in research is clearly needed. A line item for community forestry should be created with the research budget so funding can be directed to this program. We strongly support the review of activities proposed in this bill, but also suggest that creating a specific line item for funding research will help establish efforts more quickly.

Lastly, let me address the community grants portion of the bill. AFA has been working with citizens for more than a century and with community forestry citizen action groups for the last decade. This past year we started a program called Global ReLeaf that calls on citizens to take local actions to assist with a global problem. Our experience with these groups has been rewarding, and I can tell you that people will give their personal time and muscle to assist with the greening of their communities and improvement of the environment.

Our Global ReLeaf program is encouraging people in towns and cities to participate in a program to reduce global warming and make communities better places to live. Increasing the number of trees in communities, and in rural areas is part of the solution to global warming. We have asked people to plant 100 million new trees by the year 1992, and they are responding.

However, individuals have limited resources, and need help with these community improvement efforts. They need the things provided in this bill—education, technical assistance, research and community grants. Every dollar we spend in a community returns about 2 dollars in volunteer efforts. I urge the committee to take advantage of this resource and support H.R. 2144.

Thank you for this opportunity.

BACKGROUND PAPER

THE URBAN AND COMMUNITY FORESTRY ACT OF 1989

Prepared by
The American Forestry Association
May 31, 1989

Trees and forests in community areas represent a highly valuable, extremely beneficial resource. Some facts about urban and community forests and their benefits:

- The American Forestry Association estimates that urban and community forests cover 70 million acres and represent an economic value of \$50 billion.
- Large urban trees, through their shading and cooling effect, can contribute significantly to heat island reduction and energy conservation. Each degree Fahrenheit of peak summer temperature reduction results in a 2 percent energy savings, and the readily-attainable national energy cost reduction from planting community trees is in the range of \$4 billion per year.
- Community trees filter and remove air pollutants, reduce soil erosion, retard flood flows and flooding and prevent water pollution, primarily from nonpoint sources.
- Trees improve public health. In addition to pollution reduction, trees reduce noise, improve recreational opportunities, and lower human stress levels.
- Trees enhance community stability through enhancement of living quality and property value. Well-kept community trees can be a significant asset in attracting businesses and investment to a community.

Trees and forests in community areas are in a serious state of decline, in spite of current urban and community forestry programs. Some facts and factors:

- In the average city, a 1986 sample survey conducted by the American Forestry Association discovered, four trees die or are removed for every tree planted.
- An oak or maple tree that could live 200 to 400 years in a forest lives an average of 32 years in a city -- less than 10 years in a downtown planting pit. Extending life spans is the quickest way to increase the benefits produced by community trees, and improved technical assistance has been shown by research in several states to be effective in improving the condition and life expectancy of community trees.

- Causes of urban forest decline include poor design which allows insufficient space or rooting medium for healthy tree growth, excess pollution levels, and lack of maintenance.
- Urban and suburban sprawl is proceeding at an estimated one-half million acres of land each year. Improved technical assistance and community forestry education programs during the planning and construction phases can be instrumental in improving the quality of that development, lowering costs, and increasing public benefits.
- Droughts such as those that occurred in the 1980's are hard on community trees, most of which live on altered soils where normal moisture cycles have been short-circuited by pavement, buildings, and artificial drainage.
- Insect and disease epidemics are also a serious problem. Dutch elm disease, gypsy moths, and oak wilt are but a few of the pests that threaten tree and forest health.
- Tree care budgets average \$2.60 per person in American communities – virtually all of which is raised from local levies. This suggests an annual effort of \$400 to \$500 million in local tree care budgets, and this amount is still inadequate to prevent the decline of the resource.
- Total state-funded expenditures on urban forestry are not available, but are estimated to be about \$50 million per year. The current federal input is \$2.4 million for technical assistance and \$0.9 million for research, plus a small amount of urban forestry educational input through the Extension Service.
- In general, small communities lag in their ability to provide strong community forestry programs, spend less per capita on tree care, and rely most heavily on the technical assistance available through service foresters and other public sources, making the program proposed in H.R. 2144 more important to rural areas and small towns than large cities.

The federal government has had a small urban and community forestry effort since 1978. The research, education and technical assistance aspects are handled by the Forest Service, in cooperation with the state forestry agencies and universities. Direct financial assistance to communities for forestry projects has been minimal. Additional educational efforts have come through the Cooperative Extension Service, largely under the educational programs supported by the Renewable Resources Extension Act. A new federal thrust, such as proposed in H.R. 2144 would:

- Improve the research program by requiring the Secretary of Agriculture to review all ongoing research efforts and recommend new research needs;
- Improve the fact base on urban and community forests by assisting areas in conducting inventories on the numbers, characteristics, and health of trees as well as the status of related resources;

- Assist public and private organizations in organizing and conducting community forestry planting projects and programs;
- Develop new information on adapted species, improve species tolerance to urban conditions through genetics and selection, and provide more widespread information and education programs on tree care and management;
- Increase public understanding of the values and benefits to be derived from improving their community forest resources;
- Provide some seed money through competitive grants that would allow innovative and exemplary projects to proceed;
- Improve information available to the public about sources of tree planting stock, creating additional economic impact on a wide variety of nursery, tree care, garden supply and other private industries; and,
- Create a National Urban Forest Council that would develop a national urban and community forestry action plan and bring the wide variety of technical specialties and institutional actors involved in community forests together to assure that the federal program responds effectively and efficiently to the needs of communities of all sizes and situations.

The costs of this new program are estimated to be somewhere in the range of \$20 million per year in order to get an adequate impact and evaluate the potential benefits that can be produced in terms of increased state, local and private effort and investment, environmental benefits, and improved rural and community economic conditions. A rough estimate of the use of these funds would be:

- \$5 million yearly for technical assistance through the state forestry organizations. This would increase the number of full-time state urban forestry coordinators from today's 8-10 to 20-30, plus allow for some urban forestry technical assistance in every state, compared to today's 45. This amount should also allow for the expenses incurred in operating the National Urban Forest Council, and carrying out the other technical services and research reviews required by the bill.
- \$15 million for demonstration projects in communities. This would test the ability of a modest federal incentive to draw out state, local and private investment, as well as make the technical assistance more effective in achieving direct, measurable results in a fairly short time.



NEWS

RELEASE:
April 27, 1989
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The American Forestry Association • P.O. Box 2000 • Washington, D.C. 20013-2000

NEW "OASIS" LEGISLATION INTRODUCED TO GREEN UP AND COOL OFF AMERICA'S CITIES AND TOWNS

As most American communities brace themselves for another scorching summer, new legislation was introduced by Rep. Jim Jontz (D-IN) today that could turn the streets of America's cities and towns into unexpected oases.

Called the "Urban and Community Forestry Act of 1989," the bill could help "green up and cool off the streets of our communities by invigorating hundreds of millions of trees," said Rep. Jontz. "With increasing concern by the public and the Congress about global warming, and understanding of how trees in urban settings contribute positively to the quality of life in our nation's cities, I believe the time is right for urban forestry legislation," he said.

Added Neil Sampson, executive vice president of the American Forestry Association and creator of the Global ReLeaf Campaign, "Every street in America needs more -- and healthier -- trees. This bill will give us both." Sampson released an "urban releaf quotient" for 17 cities* that identified thousands of available tree-planting spaces for each city.

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Trees help reduce global warming by absorbing carbon dioxide build-up and by shading surrounding areas. They also enhance the economic value of residential and commercial property and protect open spaces, all of which improve the quality of both human life and the natural environment.

But according to Lawrence E. Scovotto, executive vice president of the American Association of Nurserymen, the health of forests in America's cities, suburbs and towns is on the decline. "The nursery and landscape industry is committed to beautifying our nation's environment and helping to reverse the global warming trend. Congressman Jontz's "Urban and Community Forestry Act" represents strong, immediate action toward both objectives," he said.

Dubbed "oasis legislation" for the soothing, cooling impact it will have on communities otherwise dominated by concrete heat islands, vacant lots, empty streets, and withering trees, the Act is intended to improve the management and promote the expansion of trees and forests in urban areas. It will also:

- * help state and local organizations develop management plans for improving the health of existing trees while identifying opportunities to plant new trees;

- * provide a competitive grants program to provide up to 50 percent of the support for urban and community forestry projects, such as tree planting; and

- * authorize the appropriation of \$20 million in each of the next ten years for technical assistance and public education

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in urban areas.

"State forestry agencies have been actively working in urban forestry for years and have long recognized the importance of stronger urban forestry programs. NASF fully supports this urban forestry legislation bill introduced today. It will provide badly needed technical and financial assistance to restore our community tree resources," said James Roberts, Maryland State Forester and President of the National Association of State Foresters.

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* Cities for which Urban Relief Quotient was released include: Washington, Los Angeles, New York, Chicago, Atlanta, Cleveland, Philadelphia, Baltimore, Detroit, Boston, St. Louis, Houston, Dallas, Ft. Worth, Hartford, Austin, Seattle.

(The publication, "Urban Forest Forum" is held in the committee files.)

A statement of
Madeline Fishel
Assistant Director of
Federal Projects
Trust for Public Land

Before the House Agriculture Committee
Subcommittee on Forests,
Family Farms, and Energy

on the Urban and Community Forestry Act of 1989
H.R. 2144

June 7, 1989

Dear Chairman Volkmer and Members of the Subcommittee:

I am Madeline Fishel, the Assistant Director of Federal Projects for the Trust for Public Land. The Trust is a national land conservation organization established to acquire and preserve open space to serve human needs. In the 16 years since its establishment, the Trust has helped to preserve nearly 450,000 acres of space, often in urban metropolitan areas since that is the prime focus of our conservation effort. Since our projects comprise segments of what has come to be called the urban forest, we have recently become more actively involved in urban forestry issues.

In California, in cooperation with 9 tree-planting organizations across the State, we have launched the California ReLeaf campaign, a branch of the American Forestry Association's Global ReLeaf Program. This enormous grassroots effort to plant 20 million trees in the State's 400 plus urban communities, will be achieved primarily through the commitment and stewardship of California residents using the models provided by experienced groups such as TreePeople in Los Angeles, San Francisco Friends of the Urban Forest, and the Sacramento Tree Foundation. The Trust is confident that this challenging goal can be achieved through citizen participation.

Our faith in community involvement in urban open space projects comes from our long-term experience with "green" activists working to revitalize and improve the quality of life in cities throughout the country. Several of our projects in New York City are excellent examples of effective community action. Through the combined efforts of a coalition of residents, the Green Guerillas, and several city agencies, green "oases" were established in this highly-urbanized environment. The Clinton Community Garden, Tudor City Parks and in Brooklyn, the Wyckoff-Bond Garden are now permanent additions to the urban forest of greater New York. Similar projects have been completed in cities ranging from Tacoma Park, Maryland to Seattle, Washington and Oakland, California.

As we have all become aware in recent months, trees, shrubs and green spaces in cities are much more important in the global environmental picture than previously recognized. Urban foresters and green advocates have long recognized the role of urban greenery in improving air quality, reducing wind and noise, and mitigating storm-water runoff and erosion. Today, however, the nation's leading scientists are telling us that trees and urban vegetation are critical in reducing the global warming trend that is occurring. We need to reduce the amount of carbon dioxide that is emitted into the atmosphere and the most cost-effective way to do so is for all of us to plant trees.

Citizens need assistance to accomplish this enormous task of filling the available planting spaces throughout our urban areas. Beyond the act of planting trees, long-term stewardship to manage the additions to the urban forest is crucial to its integrity. Many of the existing tree-planting groups around the country have been started or supported by small grants and technical assistance made available through federal urban and community forestry funds. Technical assistance and community forestry education programs made possible by these funds have also been instrumental in improving new development projects that preserve existing vegetation and important open-space areas. Unfortunately, grants and technical assistance are only available

in a few states right now. It is essential that these types of opportunities be accessible throughout the country. This is one way to ensure as many towns and cities as possible are managing their urban forests effectively.

The urban forestry movement requires research efforts as well as technical assistance. It is only through extensive and relevant research that citizens and their governing bodies can be informed about the state of their urban forest. This is critical to us as a land conservation organization. Often we need to supply current facts and data concerning the potential ecosystemic impact of developing a parcel of open space. Individuals and policy makers must have a clear understanding of the effects of urbanization on vegetation, especially trees. Inventories to determine the condition, number, and characteristics of trees are desperately needed in most cities. Research on problems such as sidewalk damage, low-cost pest management, and drought-tolerant or appropriate species for urban conditions is necessary to improve our management of urban vegetation and open space areas.

The Trust for Public Land urges your support of the Urban and Community Forest Act of 1989. We feel that H.R. 2144 provides a new federal focus that gives much needed emphasis on new research, grant and technical assistance and education efforts that will change the structure of tomorrow's communities and the urban forest that lies therein. Thank you for the opportunity to submit this statement.



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STATEMENT OF
THE HONORABLE DAVID I. WYNNE
MAYOR OF CHESAPEAKE, VIRGINIA

on behalf of
THE NATIONAL LEAGUE OF CITIES

ON

H.R. 2144

THE URBAN AND COMMUNITY FORESTS ACT

before the

SUBCOMMITTEE ON FORESTS, FAMILY FARMS AND ENERGY

COMMITTEE ON AGRICULTURE

UNITED STATES HOUSE OF REPRESENTATIVES

June 7, 1989

1302 Longworth House Office Building

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Mr. Chairman and members of the Subcommittee, I want to thank you for the opportunity to appear before you today. I am the Mayor of the City of Chesapeake, Virginia and am speaking today representing not only Chesapeake but also the 16,000 cities and towns represented by the National League of Cities.

My remarks today relate to H.R. 2144, the Urban and Community Forestry Act of 1989, as introduced by Rep. Jentz. The National League of Cities is very interested in the success of this legislation. I am confident that the technical assistance and competitive grant program provided in this legislation would be of great assistance to all communities in improving urban forestry management.

Before I begin my remarks regarding the Urban and Community Forestry Act of 1989, I would like to tell you a little about the City of Chesapeake, as I will frequently cite examples based on our own experience.

We are a city with a population of approximately 150,000. Our land area is 353 square miles and is located in the southeastern part of Virginia, within the Norfolk-Newport News-Virginia Beach SMSA. Over 54,000 acres of the Great Dismal Swamp are located in Chesapeake. Chesapeake is also the home of over 50 champion trees which are the largest of their species. As our land area might indicate, Chesapeake, at one time, had an almost completely agriculture-based economy, with a mostly rural

atmosphere. We now find ourselves with the blessings and burdens of being the second fastest growing city in Virginia. A recent Wall Street Journal article identified Chesapeake as one of the nation's "boomtowns" in terms of economic development and one of the hottest business sites in the U.S.; however, one of the burdens we are experiencing is the significant loss of trees as a result of such urbanization.

Our urban and community forests are the source of numerous environmental, economical and aesthetic benefits. Environmentally, trees reduce energy costs, filtering air, water and noise pollutants and reducing soil erosion.

Economically, since trees result in a much-enhanced urban environment, we have seen numerous corporations select Chesapeake in competitive relocation processes. Subsidiaries of Sumitomo and Mitsubishi, as well as Household Finance Corporation have all cited Chesapeake's abundance of natural amenities as factors in their selection of the community with the quality of life they desire.

Despite our economic successes, our city, as well as communities across the nation are experiencing a tremendous reduction of urban forests and open spaces. The declining health of the nation's urban forests can be seen in Chesapeake. According to the Virginia Department of Forestry, in the ten-year period 1976 through 1986, 17 percent or 15,000 acres of Chesapeake's timberland was lost, primarily as a result of the development process.

Although Chesapeake, like many localities, has been named a Tree City U.S.A. by the National Arbor Day Foundation, has adopted a local tree preservation ordinance and has its own arborist, many localities operate without home rule and may lack state-enabling authority that would encourage expenditures in this area. Our smaller and rural communities have little, if any, resources with which to gain both the technical expertise and manpower necessary to make an effective level of effort. The proposed program funding of full-time state urban forestry coordinators will be a great resource for all communities, no matter what their character.

I'd like to insert here that it is my experience, and members of the committee can verify this, that the difference in the feeling you get is quite dramatic between a community with trees and one without.

Developments with lots as small as 10,000 square feet look very different if in one neighborhood the trees are preserved, the streets are curved and different architectural treatments are used. Contrast that to a neighborhood of that same lot size, where all trees are cleared, the streets are arrow straight and the houses are identical, lined up in a row.

Funds for demonstration projects would quickly reveal the advantages for financial and technical assistance in addressing the declining health of our urban forests. My confidence in regard to this area stems from recent experience in Chesapeake. In December 1988, the City of Chesapeake Environmental Improvement Council joined forces with the Virginia Department of

Forestry, the International Society of Arboriculture, the American Forestry Association, the USDA Forestry Service and the Tidewater Builders' Association to sponsor a one-day conference in Chesapeake entitled "Building Among the Trees." The conference addressed the retention, protection, planting and care of trees on development sites. Over 250 participants attended from six states and the District of Columbia. These participants included builders, architects, arborists, state and local employees and elected officials.

This conference was hailed as a great success by presenters and participants alike. As a result of the conference, many builders are having their field supervisory employees trained in proper tree-protection methods. In addition, developers have begun giving greater emphasis to tree protection and replacement in their subdivision plans. I believe this conference represented an example of a positive public/private partnership offering concrete solutions to recognized needs. It brought together groups that often find themselves in adversarial roles and laid the groundwork for increased cooperation between the groups for the betterment of the community at large. Efforts of these types could greatly assist localities and private concerns in increasing awareness.

If one considers some of the most attractive communities across the nation and around the world, I think you would find they have several key elements in common, including abundant urban landscaping and open green spaces.

I recently came across an article from a 1985 Southern Living magazine by Philip Morris which I feel encapsulates what this proposed legislation hopes to facilitate: "Many cities have gotten used to ugliness, accepting it as inevitable to progress, a sign of the times. But there are others across the region who have questioned whether every new four-lane street has to be from tree-lined to cluttered commercial strips, why commercial development can't be compatible with residential areas, how their cities can be made attractive again. A health urban and community forest is a critical component to this end. I urge that you support the proposal before you.

Again, thank you for the honor and privilege of speaking before you on behalf of the National League of Cities. I am available for your questions.

STATEMENT OF
GREGORY BOWEN, AICP

On Behalf Of The
AMERICAN PLANNING ASSOCIATION

Mr. Chairman and distinguished Members of the Subcommittee on Forests, Family Farms, and Energy: I am Gregory A. Bowen, AICP, Deputy Director for the Department of Planning and Zoning, Calvert County, Maryland. I have over ten years of experience in planning with the Department and my responsibilities have included subdivision review, site plan review, comprehensive planning, and zoning enforcement. Recently, I have been in charge of implementing the Critical Area Program for Calvert County. The Critical Area Program is a state-initiated program intended to help protect the Chesapeake Bay during development of properties bordering the Bay and its tributaries.

I am pleased to testify on behalf of the American Planning Association on this important piece of forestry legislation. I respectfully request that the complete text of my statement be included in the hearing record.

The American Planning Association is a national organization of over 23,000 city, regional, and state planners as well as elected and appointed officials, educators and interested citizens. The APA membership belongs to forty-five chapters in virtually every state and Congressional district. The American Planning Association is the result of a 1978 consolidation of the American Institute of Planners, established in 1917, and the American Society of Planning Officials, founded in 1934.

Within the umbrella organization, APA, is the American Institute of Certified Planners, which focuses on professional development. Its members

are distinguished by having passed an examination of planning principles and practice.

The Association's primary objective is to advance the "art and science" of planning for the improved development of communities, cities, regions, states and the nation as well as for the conservation of our natural resources.

The approval of HR 2144, the Urban and Community Forestry Act of 1989, would help to accomplish this objective by establishing initiatives to enhance, protect and restore trees and forests in urban and suburban environments.

The American Planning Association shares with the American Forestry Association the recognition of the importance of trees to our urban areas in improving air quality, storm water management, sediment and erosion control, energy conservation and the beauty of the urban environment.

There is evidence that trees in urban areas are suffering. One problem is that the expertise to install, maintain and protect the trees has not reached a satisfactory level in most areas. Another problem is that enough space is not set aside for trees during the development of urban areas. As a result, the quality of life declines and energy efficiency is reduced. The proposed legislation would provide needed research, technical expertise, and pilot projects to do a better job in planning, developing, and maintaining areas for trees.

My expertise is with managing development in the suburban fringe-- those areas between city boundaries and rural areas where the greatest population growth has occurred in this nation for the last two decades. While these areas still have an abundance of trees, the impact of development on the forests is significant and disturbing.

Consider, for example, Anne Arundel County, which includes the capital city of Annapolis, Maryland, which had 175,000 acres of trees in 1959 and only 110,000 acres of trees in 1985. Similarly, Fairfax County, Virginia lost 80,000 acres of trees over the same period. It has been estimated that one-half million acres of trees are lost each year in this country due to development.

Acreage taken out of forestry production is even greater. In large lot subdivisions, forest land remains, but it no longer is held in large enough tracts to provide wildlife habitat or be practical for timber production. Not only is the land taken out of production, but the physical development of the properties often has adverse impacts on the remaining trees, water quality and animal habitats. Keeping trees healthy as land is in transition is a challenge we can only greet with adequate technical assistance.

Calvert County, in Southern Maryland, has also experienced rapid suburban growth for twenty years. In the past thirteen years, we have benefited from two special pilot forestry programs.

Through these programs, foresters have been available to perform site evaluations and recommendations prior to subdivision approvals. The

foresters have provided our staff with recommendations concerning significant trees or tree stands that should be protected and others that should be removed because they were not compatible with residential development. The result has been more tree cover retained, cleaner streams and a more livable community.

In Calvert County, we are fortunate to have citizens and elected officials who support forest and stream protection and innovative land use techniques, such as the clustering of lots, so that permanent open space area can be established. The foresters have assisted us by evaluating open space and, as a result, the quality of that space has improved.

If HR 2144 is adopted, local governments would benefit as follows:

- (1) The increased technical assistance could help local governments and communities in conducting tree or forest inventories.
- (2) The increased technical assistance would enable more local governments to improve the methods used to develop the land. As a result, more land will be set aside for forestry uses and trees remaining in the developed areas will be healthier.
- (3) The research and education programs would allow local governments in urban and rural/suburban areas to establish tree maintenance and protection programs and regulations. The APA supports the use of tree protection ordinances such as those in Cincinnati, Ohio and Alexandria, Virginia and recognizes the need to

continue to evaluate techniques and fit regulations to local conditions. The research will develop new information on tree selection, care, and management to make these efforts even more effective.

The APA recommends that the legislation be clarified to ensure that the state and local management plans for trees and associated resources called for in Section 5(a)(4) of the legislation are consistent with state and locally adopted comprehensive plans.

We also recommend that the National Urban and Community Forestry Advisory Council include a member with background and experience in urban planning to ensure that the important relationship between urban growth and forestry management be kept in the forefront of the Council's deliberations and be reflected in the national urban and community forestry action plan. We recommend that urban planning be included in Section 5(a)(g)(2)(A)(iii). APA would be pleased to provide the Secretary with the names of knowledgeable candidates to fill this Council seat.

In conclusion, the APA supports adoption of the bill. As a result of the new initiatives, we can expect improved, energy efficient and attractive urban environments and more resource efficient and attractive suburban environments.

Thank you for this opportunity to comment on this legislation. The APA will be pleased to assist Members of the Subcommittee in passing and implementing HR 2144.



NATIONAL URBAN FOREST COUNCIL

P.O. Box 2000 • Washington, DC 20013-2000

STATEMENT OF
DONALD C. WILLEKE
LEGISLATIVE CHAIRMEN
THE NATIONAL URBAN FOREST COUNCIL
TO THE
SUBCOMMITTEE ON FORESTS, FAMILY FARMS, & ENERGY
AGRICULTURE COMMITTEE
U.S. HOUSE OF REPRESENTATIVES
JUNE 7, 1989

Dear Mr. Chairman and Subcommittee members:

I am Don Willeke, Chairman of the National Urban Forest Council, and my interest in forestry is as a citizen volunteer. I am also Chairman of the Minnesota Shade Tree Advisory Committee, and I make my living as a Corporate Lawyer in Minneapolis, Minnesota.

The National Urban Forest Council was established in 1981 to organize the efforts of individuals working to improve urban and community forests. Today the Council consists of about 200 active members nationally and has seven state council affiliates. The Council communicates with 20,000 readers via a newsletter called the National Urban Forest Forum.

I commend the sponsors of H.R. 2144, the Urban and Community Forestry Act of 1989. It outlines some important actions that must be taken to make our communities better places to live. You can count on the full support of our members to assist in the passage of this important legislation.

Our urban and community resources are a valuable resource that covers a large and diverse land areas. Unlike the National or state owned forests, they are not far away -- they are the places in which we live and work. They are not large homogeneous tracks of land owned by a single agency, they are instead many tracks of land owned and maintained by a large and diverse group of people. The trees that make up this forest are everywhere from small towns to large cities. They are owned by public and private groups and managed by so many people that listing them would not be practical.

Meet Us In St. Louis, October 15-19, 1989, for the Fourth Urban Forestry Conference

The members of our Urban Forest Council reflect this diversity. They are citizen activists, managers of city tree programs, state and federal urban foresters, researchers, educators, planners, landscape architects etc. Most of them have worked very hard to maintain local and state urban forest resources for many years with modest financial support from government agencies. Many, like myself, have volunteered their energies for many years because it was the only way to maintain this valuable resource we call our urban and community forests.

We recognize the Federal government has a limited, but very important role, in tending the urban forests in the thousands of communities across the country. It must do those things which, paraphrasing Abraham Lincoln, the communities cannot do at all or cannot do nearly so well for themselves. Communities should not have to maintain technical libraries or search all across the country to find a working prototype to model a program after. Information and technical assistance should be available and organized to meet these local needs. Research should be looking ahead at problems communities will face, and helping to discover ways to keep trees healthy and thriving in communities.

It would be irresponsible and inefficient for the federal government not to participate in urban and community forestry efforts. Communities have a major investment in the trees, which play a significant role in providing clean air, water, wildlife habitat and other natural resource amenities. The basic health of this resource is threatened by many hazards including, insects, disease and community expansion. The figures showing that four trees are dying for every one planted in cities is a measure of our ignorance. Trees in downtown areas are living only ten years on average because we did not have the common sense to provide adequate space for them to grow. They are being suffocated by concrete, and misunderstandings about what trees need to survive.

Some would suggest when trees die in communities it is a local problem, but I assure you this is not a local problem, but a national dilemma. Thousands of communities are suffering exactly the same problem and very few of them have the knowledge or resources to reverse the negative trends until it is too late. I don't mean this to be a story of gloom and dooe-- it truly is not. Much of the knowledge we need to prevent these problems is available, but it just is not in the right place at the right time.

Thousands of cities across the country were hit by Dutch Elm Disease and did not have the knowledge needed to prevent the destruction of their elms. My community was one of the areas hit, and it was in the midst of this crisis that I decided to volunteer my efforts to help urban forests. As it turns out my community, the Twin Cities in Minnesota is a good demonstration of the importance of having the right information at the right time. St. Paul lost almost all its elms, 80 percent in a three year period, while Minneapolis was able to gather more facts on this issue and

embarked on a more aggressive approach to protecting their trees. Minneapolis retained 75 percent of its elms, and spent essentially the same amount of money on their program as did St. Paul. The loss of trees was devastating to St. Paul's urban forest. Similar disasters are waiting in the wings for unsuspecting communities; they include oak wilt, an unnamed disease of ash, the Gypsy Moth, and, most recently, a Eucalyptus borer in California.

What we were able to do in Minneapolis what needs to happen in the 10 thousand communities across the country. We had to gather the expertise of a broad group of technical experts, mobilize the energies of citizens, design a plan to manage our community forest and take action. Successfully addressing these problems is not all neat and orderly, however, because forests are not neat and orderly. Urban forests of this country are everywhere -- components of them exist on private property, on municipal lands, in parks, and along highways. Few of us have not at one time in our lives helped plant an Arbor Day Tree on school grounds- yet another part of the urban forests.

Education of our citizens is a complicated process. Nearly every state, county and local organ of government is involved to one degree or another. Many agencies are involved to a major degree. In a similar fashion, our urban forests are intimately interconnected with practically every element of our government structure. That situation is not going to change in either education or urban environments. We will have to live with the complexity and lack of neatness.

The National Urban Forest Council has worked to build the ties among the many players involved in managing community forests. Although the efforts have been fragmented and under-supported by government agencies, the diversity of players has brought an important depth of knowledge and energy to this field.

H.R.2144 proposes to develop a National Urban and Community Forestry Council with an official responsibility to report to the Secretary of Agriculture. As the representative an existing Council we want to fully endorse the idea. We have recognize for some time that the National Urban Forest Council would be more effective if it had an official opportunity to report observations and findings to a government agency with the means to mobilize technical support, education and research. Because community forests are not neat and orderly, and the expertise to assist communities wit this activity is in many organizations, the Council report should be to the Secretary of Agriculture rather than any one agency.

We recognize how tempting it is for every special interest group to try to dominate a committee like the one proposed in this bill, and we urge you to resist the pressure to allow this to happen. We offer the assistance of the National Urban Forest Council in evaluating the conditions of the urban forest and making reports. Our state and local councils, as well as the national council network is the most well-developed source of information about urban and community trees in the nation.

We request that the National Urban and Community Forestry Council outlined in this bill not be dominated by any group or agency. We suggest there be a balance of government, private and non-profit groups. Presently, that balance favors the Federal governmental agencies, and therefore misses some important benefits of the diversity and broad participation that has benefited past community forestry efforts.

I urge the committee to take advantage of this resource and support H.R. 2444.

JOHN M. DE NOYER

MEMBER, TOWN COUNCIL OF HERNDON, VIRGINIA

Mr. Chairman and Members of the Committee:

My name is John M. De Noyer. I am a member of the Town Council of the Town of Herndon, Virginia. Herndon is a town with a population of slightly over 15,000 that is located in the Dulles Corridor that is experiencing very rapid growth. Since 1980, over 75 % of the tree cover has been removed to make room for commercial and residential development. This rate of forest depletion far exceeds the ability of replacement plantings to provide for environmental benefit, beauty, shade, and control storm water runoff. In addition, the street trees in the older parts of town are being stressed by increased traffic, soil compaction, and root damage from adjacent construction and upgrading of utility systems.

The visible impact of clear cutting each development parcel made our citizens realize that something had to be done and done now. Their voice was clear in the last Town election on May 10, 1988. All three environmentally oriented challengers were elected to the Town Council. Since the new Council took office on July 1, 1988, a number of changes have taken place in both policy and practices concerning tree conservation. First, we passed a resolution that stated the town's new policies concerning tree conservation and published this policy in a brochure that is given to each applicant for a site plan or rezoning. Second, we made greater attempts to enforce existing regulations for tree protection. This has not been entirely successful because the staff for site plan review and the inspections were not adequately trained in tree conservation and protection measures. Third, we amended the Zoning and Subdivision Ordinances to provide for tree inventories, designation of heritage trees, and bonding of trees to be saved. Fourth, we hired an Urban Forester who started work as a member of the Town Manager's Staff on May 8, 1989. His name is John Dudzinaky and I would like to introduce him to you at this time. He will be available to help answer any questions that the Committee may wish to ask.

Until this year, local governing bodies in the Commonwealth of Virginia could only base tree preservation ordinances on the Erosion and Sediment Control provisions of the Code of Virginia. This made it difficult for many localities to enact adequate ordinances. Two important amendments were approved by the General Assembly on April 5, 1989. These Code changes authorized certain localities to adopt tree conservation ordinances and to adopt tree replacement ordinances. Since the Commonwealth of Virginia is a Dillon Rule State, we can now base local ordinances on the value of trees themselves rather than only on their benefit in controlling erosion and sedimentation.

We welcome the provisions that are proposed in the Urban and Community Forestry Act of 1989. The Town of Herndon has started on a course to reverse previous trends and do our best to set an example in good urban forest practices. We know that we can not solve the national or global problems of deforestation, but we can start at home and hopefully many other local jurisdictions will be encouraged to start similar efforts. Together, we can make a big difference. Small municipalities, and many larger ones, need assistance. The Office of Urban Forestry in the Department of Agriculture, Virginia Department of forestry, and the Fairfax County Arborist's Office have provided valuable assistance to the Town of Herndon in planning and implementing our present start in tree conservation. We have a long way to go. We need assistance in many areas such as technical information; research on improved species of trees, tree selection, and planting methods for the urban environment; and implementing and maintaining an effective tree inventory.

Herndon may be in better shape than many metropolitan area municipalities. We at least realize that we have a problem and we are trying to do something about it before all the forest is paved over and it is too late to

take corrective measures. We will not accomplish much unless other neighboring jurisdictions across the country join in effective programs for tree preservation.

I would like to commend the sponsors of this bill for championing the cause of urban forestry. This is a first step. My experience in the federal government has taught me that an AUTHORIZATION does not necessarily lead to IMPLEMENTATION. I am convinced that I reflect the opinions and concerns of a broad spectrum of citizens in areas of rapid development across our nation. We hope that this bill passes. If it does pass, then the next big challenge will be to get the needed funding into the President's budget and to get the budget approved by the Congress. I stand ready to lend any support that may be appropriate to encourage funding for this program and implementation of the stated objectives.

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THE INTERNATIONAL SOCIETY OF ARBORICULTURE

TEXAS CHAPTER INC.
 P.O. Box 9855
 College Station, Texas 77842

June 20, 1989

The Honorable Harold Volkmer
 Chairman, Subcommittee on Forestry,
 Family Farms and Energy
 Rm. 1336, Longworth Bldg.
 U.S. House of Representatives
 Washington, D.C. 20515

Dear Congressman:

The Texas Chapter of the International Society of Arboriculture would like to extend its support to the funding of HR2144, Urban and Community Forestry Act of 1989. Texas has long been a state where trees have played a significant role in the history and evolution of the state. Proper tree care in the urban environment is becoming an extremely important issue and should be addressed at the federal level.

In Texas, particularly the central part of the state, our stately live oak has been ravaged by a fungus, oak wilt. In many cities throughout this area, trees are dying and leaving the landscape barren. Passage of HR2144 would allow for suppression efforts, research into disease controls, and replanting programs.

The urban environment would indeed be a harsh place to live would it not be for the aesthetic qualities trees provide. Cooling the atmospheric temperatures, providing noise abatement, blending landscaping with the straight lines of buildings, and providing a source of oxygen for all to breathe are but a few of the many valuable roles trees play in creating a favorable habitat in which to live.

In summary, our membership is unanimously in favor of this legislation and we would like to provide our backing for its passage.

Very Truly Yours,

Mark Heil
 President